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TORREYA

A Bi-Monthly Journal of Botanical Notes and News

John Torrey, 1796-1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

VOLUME 40

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Volume 40 January-February, 1940 Number 1

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TORREYA

Vol. 40 January-February, 1940 No. 1

The Microfossils in a Pre-Kansan Peat Deposit Near Belle Plaine, Iowa

L. R. Wilson and R. M. Kosanke

Interglacial deposits containing plant remains have been known for a number of years, however few of these have been critically examined by paleobotanists. Early studies of this nature dealt entirely with macroscopic plant remains, but since the development of micropaleontology, these deposits can be further studied and interglacial peats and silts can be examined for pollen and spores and made to produce extensive assemblages of fossils. In the Middlewest there exists but a single previously published paper dealing with plant microfossils of Pre-Kansan peat. This work was done by Nielsen[1] in southeastern Minnesota. In addition to examining the wood fragments which proved to be *Picea* and *Larix,* a study was made of the peat pollens and spores. He records species of *Picea, Abies, Betulaceae, Acer rubrum, Lycopodium complanatum, L. lucidulum, Juglans* or *Carya, Prunus* (?), and *Juniperus* or *Larix*. The two last mentioned genera may not be correctly identified since it is doubtful that pollens of these forms exists as fossils in peat. Such an assemblage of plants as recorded by Nielsen would suggest a forest of greater complexity than has been indicated by younger interglacial plant deposits.

In 1937 a portion of U. S. Highway 30, near Belle Plaine, Iowa, was rerouted and extensive cuts were made through Nebraskan and Kansan glacial drifts. Lying between the two drifts were found several exposures of Aftonian peat. These probably represent a single deposit. The location of this deposit is in the southwestern portion of York Township, in Tama County, Iowa. The locality at which collections were made is 4.9 miles west of the county line on U. S. Highway 30. The peat layer at the best exposure was approximately six inches thick, and collections were made through this at two inch intervals. The top-most collection

[1] Nielsen, E. L. A study of a Pre-Kansan peat deposit. Torreya **35**: 53–56: 1935.

was made in direct contact with the Kansan drift and the bottom collection in contact with the mineral soil of Nebraskan age.

The methods employed in preparing the peat for examination are as follows: The dried peat was broken down by crumbling and boiling it in water until dispersed. Then several cubic centimeters of 10 percent ammonium hydroxide was added and the liquid was thoroughly stirred. This was passed through a one millimeter mesh screen and the liquid was allowed to settle. After decanting, the liquid was again stirred and temporary microscopic mounts made. These were studied under a microscope using a 15× ocular and a 3 millimeter objective. The slides were controlled and systematically examined with a mechanical stage.

Plant microfossils were fairly abundant and one hundred and fifty from each level were counted and percentages computed for the various species. In Table 1 are listed the percentages. These

TABLE 1. Percentages of microfossils in a Pre-Kansan peat deposit near Belle Plaine, Iowa

	Depth in Inches from Upper Contact			
	6	*4*	*2*	*0*
Species	*Percents*			
Sphagnum	0.0	5.3	59.5	0.0
Pinus Strobus and *P. resinosa*	9.0	20.0	8.9	9.3
P. Banksiana	0.0	0.0	0.0	1.3
Picea glauca	31.8	12.3	4.6	44.0
P. mariana	18.5	0.0	3.0	18.0
Abies balsamea	4.5	6.1	0.0	10.6
Gramineae	22.7	24.6	.7	2.6
Cyperaceae	0.0	10.0	5.3	2.6
Betula sp.	4.5	.7	4.1	6.6
Quercus sp.	4.5	11.4	2.0	2.6
Acer sp.	0.0	0.0	5.3	0.0
Tilia sp.	0.0	0.0	1.3	0.0
Compositae	4.5	9.6	5.3	2.6

are computed from all of the recognized fossils that occurred in the samples. Figure 1 shows graphically the percentages of tree-pollens. These were computed exclusive of the moss spores and herbaceous pollens. An examination of the species recorded in Table 1 indicates that like the fossil floral assemblage in Minnesota, it is one of considerable complexity. If one compares the two assemblages, they are found to be strikingly similar. The

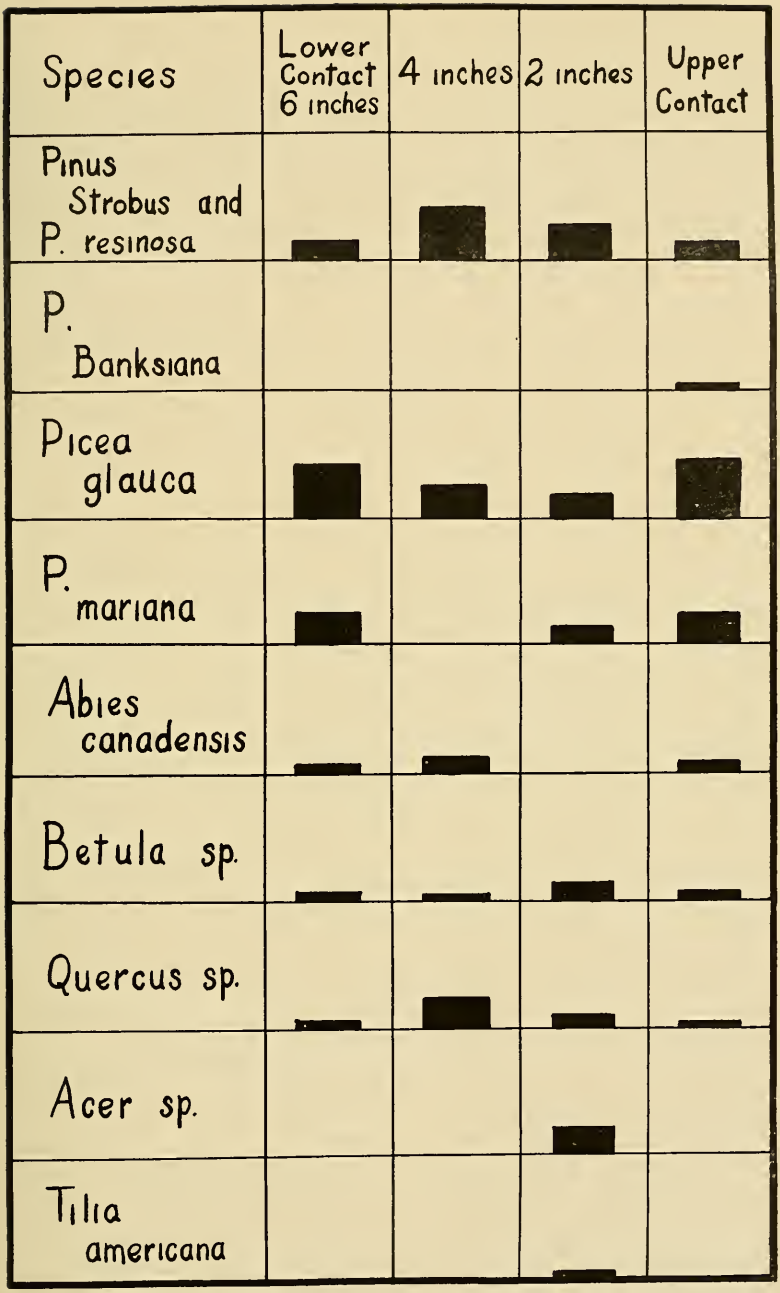

FIGURE 1. Graphs showing percentages of tree-pollens in a Pre-Kansan peat deposit near Belle Plaine, Iowa. The height of each rectangle represents eighty percent.

absence of *Juglans* or *Carya* in the Iowan deposit may be significant, but the presence of *Tilia, Quercus,* and Compositae species in the later deposit may be taken to represent an ecology similar to that suggested by *Juglans* or *Carya.* The assemblages of fossils suggest a forest of the transitional type which exists between the northern coniferous forest and the more southern broad-leaf forest of today. The fossil assemblages in both peat beds suggest a forest type that no longer exists within the immediate vicinities of the deposits.

The graphs (Fig. 1) show that the early forest which developed on the Nebraskan drift, and indicated by the fossils in the six inch level of the peat bed, was that of *Picea, Pinus,* and *Abies* type. In addition, a small percentage of *Betula* and *Quercus* existed. Two inches above the lower contact (4 inch level), *Picea glauca* pollen is less abundant and *Picea mariana* was not found. *Abies* and *Pinus Strobus* or *P. resinosa* are more abundant than in the lowest level, and *Quercus* has increased in importance. In the two inch level, *Picea glauca* continues to decrease while *P. mariana* returns to a place of importance in the pollen diagram. *Betula* increases but *Quercus* is less important and *Acer* and *Tilia* appear for the first time. *Abies* is absent from this level. With the exception of one additional species (*Pinus Banksiana*), the percentages of pollens at the contact of the peat and the Kansan drift is almost identical with those at the contact of the peat and the Nebraskan drift. The return of the tree-pollen percentages at the top of the deposit, to ones similar to those at the lower contact, is suggestive of a return of forest conditions like those in early Aftonian time. Such appears to have been the status of the forest near Belle Plaine, Iowa, when it was overridden by the Kansan Ice. The pollen percentages at the upper contact also suggest that as the ice advanced into central Iowa, there was a change from a broad-leaved and coniferous forest, as suggested in the two inch level, to a more general coniferous forest, indicated by the microfossils at the upper contact.

A detail in the development of the peat is indicated by the presence of *Sphagnum* spores. In Table 1 these are shown to range in abundance from zero percent in the lowest level, to 5.3 percent in the four inch level, and 59.5 percent in the two inch level, and finally back to zero in the uppermost level. These percentages suggest a development of a small pond into a bog. No macroscopic remains of

Sphagnum were found in the peat, but in the upper levels a few partially macerated cells of *Drepanocladus* mosses were observed. That the early sediments were deposited in an aquatic environment is further shown by the presence of sponge spicules and protozoan tests. Except for sponge spicules of the *Spongilla* type, and *Diflugia* tests no animal fossils were observed.

Coe College,
Cedar Rapids, Iowa.

New Plant Records for West Virginia*

Earl L. Core

Since the publication of Strausbaugh and Core's additions (1) to the Millspaugh check-list of the West Virginia flora (2) numerous new species have come to light through continued botanical explorations and herbarium studies. Additional information concerning the distribution of certain plants previously reported has been accumulated and, pending the completion of a revision of the Millspaugh check-list, now under way, it is felt that workers might welcome publication of these data.

Abies balsamea Miller. Millspaugh (3) originally referred the West Virginia blister pine to *A. balsamea* Miller. However, its characters did not seem to match exactly those of that species and he later (4) decided that the West Virginia plants belonged rather to *A. Fraseri* (Pursh) Lindl. A. B. Brooks, in his *West Virginia Trees,* also discussed this species under *A. Fraseri* (5). Core pointed out the doubtful nature of this determination (6) and Wherry (7) pronounced the plant as apparently the intermediate between the two species, named by Fernald *A. balsamea* var. *phanerolepis* (8). Fulling described a similar plant from the Blue Ridge Mountains of Virginia as *A. intermedia* (9). To one conservative enough to believe that binomials are sufficient for the ordinary individual, there is now no question but that the West Virginia plant may be correctly named *A. balsamea.*

The discovery, in May, 1938, of this tree near Stony River Dam, in Grant County, by Maurice Brooks and I. B. Boggs, brings

* Contribution No. 7 from the Herbarium of West Virginia University.

to four the number of counties in the State in which it is known to occur. Other stations are in Canaan Valley, Tucker County, Blister Swamp, Pocahontas County and Cheatbridge, Randolph County.

Xyris torta Sm. The species of *Xyris* found in West Virginia was reported by Strausbaugh and Core as three distinct species, *X. caroliniana* (10), *X. arenicola* (10), and *X. flexuosa* (11). Fernald's study of our material, however, has revealed the fact that only one species is represented, the *X. flexuosa* of Chapman (12) and of most subsequent authors, including Robinson and Fernald in the 7th edition of Gray's Manual, page 263, but not of Elliott (13), who first characterized the species, Muhlenberg's earlier use of the name (14) being invalid because of lack of description. According to Rendle (15), this plant is now correctly called *X. torta* J. E. Smith (in Rees, Cycl. 39. no. 11. 1819). Raleigh County, Flat Top Mountain, *Core* 3110. Fayette County, Cotton Hill Station, *W. V. U. Bot. Exped.*

Commelina hirtella Vahl. Near the 4-H Fair Grounds, Kanawha County, *Greenlee*. First record for the State.

Yucca filamentosa L. Frequently escaped from cultivation, but not hitherto reported for the State. Hanging Rock, Hampshire County, *Frye*.

Trillium nivale Riddell. Although this species is reported by Millspaugh from Monongalia, Grant, Tucker, and Randolph Counties, only one locality is represented by specimens in our herbarium, and no other station is known to the author. Pendleton County: Black Thorn Creek, near Franklin, *I. B. Boggs*.

Isopyrum biternatum (Raf.) T. & G. Near Lesage in Cabell County, *Brooks and Margolin*. First record for the State.

Aquilegia coccinea Small. This plant, through its larger size, lanceolate, longer sepals, and follicles with erect tips, seems clearly distinct from *A. canadensis*. Specimens collected on North Fork Mountain, Pendleton County, have the sepals mostly 15 to 21 mm. long, whereas in typical *A. canadensis* they are less than 13 mm. long. Follicles of normal *A. canadensis* have widely spreading tips. *A. coccinea* is also definitely separated through its blooming season, which is characteristically mid-summer.

Aconitum reclinatum Gray. Asa Gray, while on an exploring trip in the southern Appalachians in 1843 (16), discovered

on Cheat Mountain, in what is now Randolph County, West Virginia (17), a plant which he had named *A. reclinatum* (18) from its trailing habit. It is frequently found, however, as a nearly erect plant, especially if growing in a close mass of vegetation. Rydberg (19) named the erect form *A. vaccarum,* citing, as the type locality, "the east slope of Spruce Knob," Pendleton County, West Virginia. My comparison of the type specimens indicates that there is no ground for separating the Pendleton County plant; hence the name *A. vaccarum* lapses into synonymy.

ALYSSUM ALYSSOIDES L. Judy Gap, Pendleton County, *Mr. and Mrs. Davis* 1706. The first record for the State.

ARABIS GLABRA (L.) Bernh. Along Dunkard Creek, near Core, Monongalia County, *Strausbaugh and Core;* Davenport, Tyler County, *Berkley;* Pink, Calhoun County, *Harris.* Not in Millspaugh.

POLANISIA GRAVEOLENS Raf. Growing in ballast at Nitro, Putnam County, *Strausbaugh.* First record for the State.

POLANISIA TRACHYSPERMA T. and G. Growing in ballast at Nitro, Putnam County, *Strausbaugh.* First record for the State.

SPIRAEA JAPONICA L. f. Abundantly escaped from cultivation in the Swiss community of Helvetia, Randolph County, *Mr. and Mrs. Davis* 1405. First record for the State.

CORONILLA VARIA L. Escaped from cultivation near Hanging Rock, Hampshire Co., *Frye.* First record for the State.

VIOLA PRICEANA Pollard. Along Lunice Creek in Grant County, *Mr. and Mrs. Davis* 2467. This plant is regarded by Brainerd as an albino form of *V. papilionacea* but Small calls attention to the fact that in that species the flowers are violet with a white center while in *V. Priceana* the condition is reversed.

HARPERELLA VIVIPARA Rose. No species of *Harperella* was known in the range of Gray's Manual at the time of the appearance of the 7th edition, Rose's plant not being described until 1911. (20). Britton and Brown (2nd edition, 1913) reported it as found on the "banks of the Potomac River, Maryland." The plant was first discovered in West Virginia by Strausbaugh, being found in abundance along Sleepy Creek, Morgan County, July 8, 1938.

TORILIS ANTHRISCUS (L.) Gmel. In calcareous soil, weedy roadside, 3 mi. s.e. of Charles Town, Jefferson County, *E. T. Wherry,* July 23, 1933. First record for the State.

PYROLA CHLORANTHA Sw. Camp Frame, Berkeley County, *H. Ison Shreve,* May 28, 1937. First record for the State.

PHLOX OVATA L. Grant County: Mt. Storm, *Mr. and Mrs. Davis,* 1731. Summers County: near Big Bend Tunnel, *Boone* 125. Greenbrier County: White Sulphur Springs, *W. V. U. Bot. Exped.* Hardy County: near Moorefield, *Gamble.* Not in Millspaugh.

SALVIA LANCEAEFOLIA Poir. Grant County: Cabins, *Mr. and Mrs. Davis* 1778. Gray's Manual records this species as occurring on plains and open soil, Indiana to Nebraska, Texas, and Arizona, and introduced at Columbus, Ohio. The Cabins record is the first for West Virginia.

LINARIA MINOR (L.) Desf. This weed, introduced from Europe, was discovered by Strausbaugh growing in ballast at Nitro, Putnam County.

MARTYNIA LOUISIANA Mill. An occasional weed in gardens in this State. Tucker County: Parsons, *Headley.* Kanawha County, Charleston, *Sheldon.* Monongalia County: Morgantown, *Peairs.*

SOLIDAGO HARRISII Steele. (Contrib. U. S. Nat'l Herb. 13: 369. 1911.) Monroe County: Slaty Mt., *W. V. U. Bot. Exped.* Hampshire County: *Sharp.* Grant County: *Mr. and Mrs. Davis.* Although reduced by Britton and Brown (21) to synonomy under *S. arguta,* this plant seems clearly distinct from its lower stature and broader panicle, its shorter and more dilated leaves, its more broadly winged petioles, and its much earlier blooming season. Specimens in bloom have been collected in Grant County as early as June 10.

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MORGANTOWN, W. VA.

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Guide to the Lichens of the New York Area—Part 5

G. G. Nearing

Group 7. The Leather Lichens. Papery Lichens most of which have an upper surface looking somewhat like finished leather, while the under surface resembles the unfinished side of leather. Varying from large mats of radiating trunks and branches with broad tips, to small, scattered, saucer-shaped or fan-shaped fragments. Algal cells mostly in chains, but the chains short and imperfect. Fruits light red to brown or blackish. Spores long and narrow, colorless or brownish, divided into 2 or more cells.

Key to the 4 genera

Fruits saucer-shape, on the upper surface.....Sticta
Fruits saucer-shape, sunk in marked depressions of the upper surface .....Solorina
Fruits on the under surface of special marginal lobes which fold upward .....Nephroma
Fruits on the upper surface of special marginal lobes. Under surface with thickened veins .....Peltigera

Sticta. The name means "speckled," referring to pale dots on the under surface, but the genus as used here includes 3 species which lack the speckling, and are sometimes placed in a genus Lobaria, a subdivision which seems unnecessary. The under sur-

face is more or less covered with a fine down or nap and has usually a few small, scattered holdfasts. In most of the species, the algal cells are Nostoc, which should be in long chains, but which are here imperfectly developed, and can be distinguished from the more common Protococcus by their much smaller size, dull blue-green color (contrasting with the bright green of Protococcus), and their frequent appearance in chains of 3 or 4 together, sometimes more.

Sticta amplissima. Spreading Leather Lichen

Also called *Lobaria amplissima.* Found only occasionally on tree-bark, more rarely on rocks, throughout the New York area, but often large and striking, sometimes in mats 30 or 40 cm. across. The rather flat branches and lobes wavy-margined, as much as 1 cm. across, but usually dividing into narrower tips. The upper surface, smooth, or with narrow wrinkles, is usually pinkish gray or pearl-gray when dry, but when wet is deep grass-green. The downy under surface, pale buff at the margin, may become umber-brown toward the center. The algal cells are said to be Protococcus, but look like Nostoc except that they do not occur in chains.

Fruits are frequent and plentiful, light red when young, becoming brown or blackish with age. They are saucer-shape, up to 3 mm. diameter, usually rather regular, with a thin, smooth, pale rim, and are scattered over the central parts; but small, immature ones appear near the tips as hemispherical warts 1 mm. or less in diameter, each showing a depressed red dot in the center. Spores 4-celled, colorless, 30 to 65 by 4 to 8 microns.

Sticta amplissima at first glance resembles the smaller *Parmelia tiliacea,* and though usually tinted pinkish, may be greenish or bluish gray. The distinct red color of the young fruits distinguishes it from all Shield Lichens, and wetting it brings at once the characteristic deep green color, much greener than any large Papery Lichen which could be mistaken for it. *Peltigera aphthosa* which also turns green when wet, has thickened and darkened veins beneath. From the other Leather Lichens, except *S. herbacea* which is exactly like it in nearly everything but size, and *S. scrobiculata,* which bears warty soredia along the margins, *S. amplissima* stands out by its resemblance to a typical Parmelia. It is also the only Sticta which can be expected to fruit much in the New York area.

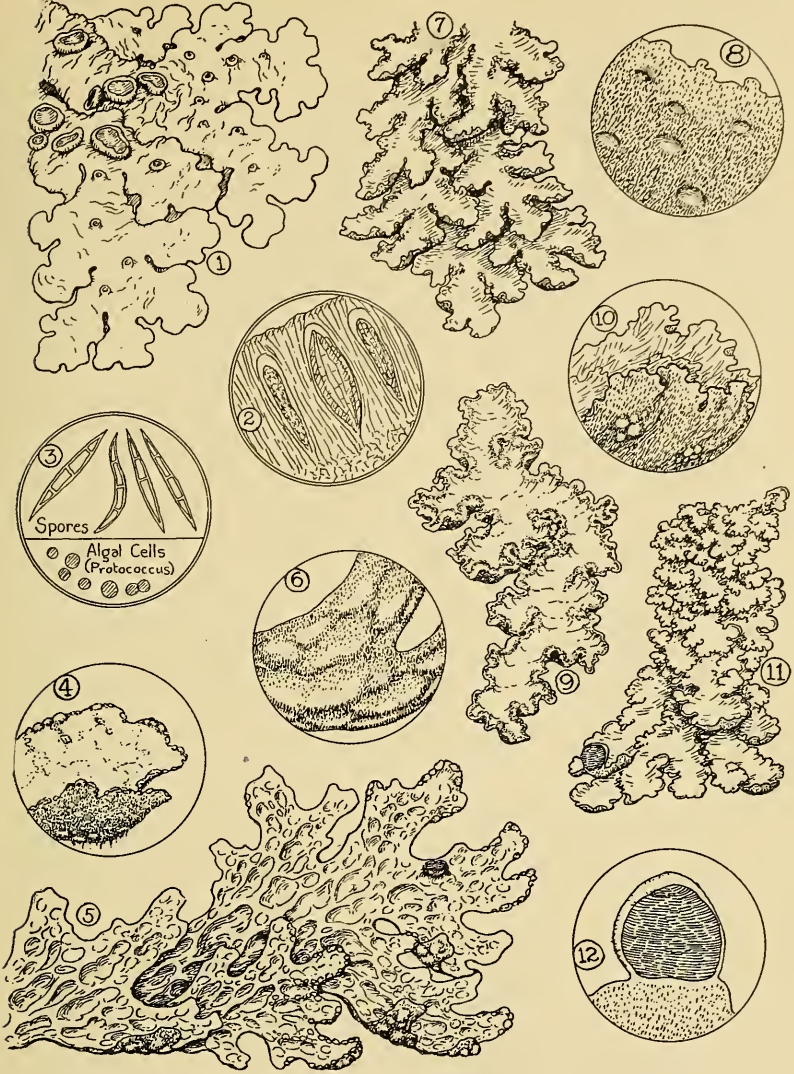

PLATE 9

Fig. 1. *Sticta amplissima,* gray. Fruits light red.

Fig. 2. *S. amplissima,* section of spore layer.

Fig. 3. *S. amplissima,* spores.

Fig. 4. *S. scrobiculata,* tip, showing soredia above and speckling below.

Fig. 5. *S. pulmonaria,* gray or brownish.

Fig. 6. *S. pulmonaria,* downy under surface.

Fig. 7. *S. quercizans,* leather-brown.

Fig. 8. *S. quercizans,* downy and speckled under surface.

Fig. 9. *S. crocata,* brown with yellow margins.

Fig. 10. *Nephroma resupinatum,* tip showing tubercles beneath.

Fig. 11. *N. helveticum,* brown

Fig. 12. *N. helveticum,* under surface of fruiting lobe.

Sticta herbacea. Grass-Green Lichen

Also called *Lobaria herbacea.* This species, rare in the New York area, differs from *S. amplissima* only in being smaller and thinner, and in having spores divided into only 2 cells and measuring 26 to 44 by 9 to 11 microns. It should be looked for on tree bark. For general characters and comparisons, see *S. amplissima.*

Sticta scrobiculata. Warty Leather Lichen

Also called *S. verrucosa* or *Lobaria scrobiculata.* Reaching only the extreme northern limits of the New York area, where it may be looked for on tree-bark or over mosses. The lichen forms somewhat irregular rosettes 15 cm. or more across, but with little-divided, wavy-edged lobes as much as 3 cm. across. The smooth or somewhat pitted upper surface is greenish or yellowish gray, often with gray or bluish dusty warts 1 mm. or so in diameter along the margins and ridges. The under surface, pale to dark brown, is clothed with down, but speckled with chalky white, roundish bare patches up to 2 mm. in diameter. Algal cells in chains (Nostoc).

Fruits are unknown in this region.

Sticta scrobiculata differs from *S. amplissima* in its much broader lobes, thicker and more leathery texture, but particularly in the white-speckled under surface. All other speckled Leather Lichens are brown, not gray, and the speckles beneath *S. sylvatica, S. quercizans* and *S. fuliginosa* are tiny smooth cups, not mere bare spots. No others have the gray soredia above except *S. pulmonaria* which, instead of speckling below, has a pattern of mounds and grooves, with the summits of the mounds often bare, but buff, not white. *Nephroma resupinatum,* with smaller parts, has white warts on the under surface, but these hardly resemble the flat, white spots of the Sticta. Gray forms of *Peltigera polydactyla* and *P. malacea* may appear speckled beneath, but the pale spots are spaces between darkened and thickened veins, and are not bare. Also the enlarged holdfasts of the Peltigera contrast with the small, sparse ones of Sticta. Yet there are forms of Peltigera which when sterile are sometimes mistaken for *S. scrobiculata.*

Sticta pulmonaria. LUNG LICHEN

Also called *Lobaria pulmonaria.* Found occasionally throughout the New York area on tree-bark, over moss at the bases of trees, or on rocks. It forms rather regular, open rosettes up to 25 cm. across, with branches 1 cm. or more wide, ending in angularly tipped lobes usually about 5 mm. wide. The tips are commonly lifted from the foothold as much as 1 cm. Color varies from pale greenish gray to brownish or even blackish when dry, olive-green when moist. The surface is pitted as much as 4 mm. deep, with rounded ribs forming a network between the pits, while the lifted margins and sometimes the ribs may be studded with dusty, gray soredia, with prongs or coral like growths, or with miniature lobes. The under surface is a reverse of the upper, because the substance is thin, and like paper impressed with a seal. The pits of the upper surface become lumps below, the ribs become grooves. The color beneath is buff near the margins, more or less covered with a brownish down, becoming dark brown toward the center. But the humps tend to be bare of down, and show pale buff in contrast to the brownish down of the grooves. The algal cells are not in chains.

Fruits, not common, are disk- or saucer-shape, reddish brown, up to 4 mm. in diameter, close to the margins of the upper surface. Spores 2-celled or 4-celled, 18 to 33 by 6 to 10 microns, colorless when mature.

Sticta pulmonaria is a striking lichen, unique, but suggesting Cetraria, just as *S. amplissima* suggests Parmelia. It approaches *Cetraria lacunosa* (Group 4), but is easily distinguished by the downy under surface, larger size, and comparatively slight lifting of the tips. *S. pulmonaria* is the most deeply pitted of our lichens. The pitting in *Parmelia saxatilis* (Group 6) is much shallower, and the under surface wholly black. Other pitted species of Sticta from which *S. pulmonaria* must be distinguished are *S. scrobiculata, S. sylvatica* and *S. anthraspis,* all northern forms, and all with the under surface distinctly speckled. They are besides less narrowly lobed, and sometimes hardly branched at all, suggesting the Rock Tripes (Group 12). It is worth noting that the pitted structure is exactly the reverse of the blistered pattern in *Umbilicaria pustulata* and *U. pennsylvanica* (Group 12).

Sticta anthraspis

A northern lichen perhaps not found in the New York area. The upper surface is pitted much like *S. pulmonaria,* but the branches are as much as 4 cm. across, and but slightly lobed. The under surface is clothed all over with a longer brown nap often 1 mm. deep, and speckled with whitish dots 0.5 mm. or less in diameter, and mounted level with the surface of the nap. The algal cells are Nostoc.

Sticta sylvatica. Woodland Leather Lichen

A northern lichen found on trees or rocks as far south as the Catskills, and perhaps also in New Jersey. Usually 3 cm. across or smaller, it may sometimes spread as much as 10 cm. The upper surface is only slightly pitted, leather-brown, olive when moist. There may be minute, gray granules scattered over it. The under surface is covered with a downy nap, buff near the margins to almost black toward the center. It is speckled over with whitish, smooth, cup-like depressions mostly less than 0.5 mm. in diameter. The algal cells are Nostoc.

Fruits rare, usually near the margin, up to 2 mm. across, flat or swollen, reddish brown. Spores with 2 or 4 cells, colorless, 25 to 46 by 7 to 9 microns.

Sticta sylvatica is hardly distinguishable from *S. quercizans* and *S. fuliginosa,* which are separate species in a historical sense, with distinctions about which famous lichenists have disagreed. *S. sylvatica* is of thinner texture, almost like *S. herbacea. S. quercizans,* thick and leathery, divides into rather narrow branches and lobes, with crisped margins covered with granules and coral-like growths. *S. fuliginosa* has the granules black or blackish, passing into an incrustation, is thick in texture, like *S. quercizans,* but broad-lobed like *S. sylvatica.* These are minor variations, and the group would be easier to comprehend if they were ignored. But the names date back more than a century, making it difficult now to select one and include the others under it. Taken together, the three species are easily distinguished from all other lichens by the combination of two characters—leather brown upper surface, and downy, speckled, veinless under.

Sticta quercizans. Oak Leather Lichen

A southern lichen found rarely throughout the New York area on trees. It may spread as large as 15 cm., with lobes up to 1 cm. across, overlapping shingle-fashion. The margins are raised and crinkled, bordered with gray granules and coral-like growths. The upper surface is smooth, leather-brown, often becoming reddish when long dry, the under surface covered with a downy nap, and speckled with cup-shaped dots 0.5 mm. or less in diameter. Algal cells Nostoc.

Fruits, rare in this region, resemble *S. sylvatica.*

For comparisons, see *S. sylvatica.*

Sticta fuliginosa. Sooty Leather Lichen

To be looked for on trees and rocks rarely throughout the New York area, but less rare in New England. A small lichen, usually less than 4 cm. across, but little divided, and with shallowly separated lobes as much as 2 cm. across. The upper surface is smoky brown, dotted or incrusted with blackish granules, the under pale brown with a downy nap, speckled with whitish, cup-shaped dots 0.5 mm. or less in diameter. The algal cells are Nostoc.

Fruits rare, resembling *S. sylvatica.*

For comparisons, see *S. sylvatica.*

Sticta crocata. Gold-Edge Lichen

On trees and rocks anywhere in the New York area, rare, but so conspicuous that many specimens have been collected. Grows in irregular rosettes as much as 15 cm. across, branches usually about 1 cm. wide, the margins lifted and crinkled, dusted with bright yellow soredia, which may also be scattered over the leather-brown upper surface. The under surface is covered with a brown, downy nap speckled with dusty yellow dots sometimes 1 mm. in diameter. Algal cells Nostoc.

Fruits rare in the New York area.

Sticta crocata and the similar *S. aurata* are the only local lichens speckled with yellow beneath. *Cetraria pinastri* and forms of *C. juniperina* have yellow margins, but their under surface is uniformly yellow and not downy. *C. Oakesiana* (Group 5) has green or yellow-green margins, and a habit similar to *Sticta cro-*

cata, but a smooth, brown, unspeckled under surface. No other local Papery Lichens, except the all-yellow species of Group 9, have conspicuous yellow margins. In outward aspect, *S. crocata* and *S. aurata* are much alike. *S. aurata,* however, may turn rosy red when dry, and is yellow *within,* as seen where broken, while *S. crocata* is white within. The algal cells in *S. aurata* are probably Protococcus.

Sticta aurata

A subspecies of *C. crocata,* requiring no separate description. See *C. crocata.*

Nephroma. A genus distinct from our other Papery Lichens in having fruits on the *under* surface of special marginal lobes, which curl or fold upward to expose them. Fruits, however, are scarce, and for ordinary identification, the other characters must be noted.

Nephroma resupinatum. Back-Fruiting Lichen

Growing on the mossy bases of trees, usually in rather deep woods, not common. It forms irregular rosettes up to 15 cm. or more across, with branches up to 1 cm. wide, though usually smaller. Margins are lifted and waved in irregular fashion, often bearing smaller, fan-like lobes. The upper surface may be gray or brown, sometimes purplish, smooth or slightly wrinkled, more or less covered with a very light down. The under surface is covered with a brown, downy nap, on which are found clusters of white, globular tubercles, each usually less than 0.5 mm. diameter. The algal cells are Nostoc in fairly distinct chains.

Fruits rather rare, up to 1 cm. across, nearly circular, occupying the entire under surface of special lobes or flaps extending from the lifted tips of the branches. Spores brownish, 4-celled or sometimes 6-celled, 19 to 26 by 4 to 7 microns.

Nephroma resupinatum is the original species from which several subspecies have been segregated. It is the only Nephroma, and in fact the only local lichen with white tubercles on the under surface. These would not be mistaken for the flat or cupped speckling beneath species of Sticta. Otherwise *N. resupinatum* resembles *Sticta amplissima,* differing in its darker color, thinner tex-

ture, and the tendency of the tips to rise 5 mm. or so from the foothold. *N. helveticum,* a more common subspecies, has the margins toothed and splitting into small lobes and coral-like growths. *N. parile* has blue-gray soredia along the margins. *N. laevigatum* is smooth on both surfaces. All three subspecies are distinguished by the absence of whitish tubercles. From species of Peltigera, all these are separated by the want of any thickened veins or large root-like holdfasts.

Nephroma helveticum. Swiss Lichen

Also called *N. resupinatum* forma *helveticum.* A subspecies found on rocks or mossy trees in deep woods throughout the New York area, fairly frequent in western New Jersey. It spreads irregularly in dense mats up to 10 cm. or more across, with branches, when they can be measured, usually about 5 mm. wide, but these divide into many thin, fan-like lobes, rising often 1 cm. from the foothold, the crinkled margins commonly covered with coral-like growths and granules. The upper surface is typically leather-brown, but may be grayish or purplish. The under surface, pale brown and minutely wrinkled near the margins, becomes black and complicated towards the center, where it is clothed with a downy nap.

Fruits scarce, up to 6 mm. across, occupying the under surface of special lobes, reddish brown. Spores brownish, 4-celled, 15 to 22 by 5 to 9 microns.

As *N. helveticum* is usually found sterile, it is not easily identified by one who does not know it, yet has a characteristic appearance. The many coral-like growths and miniature lobes decorating the crinkled margins, make it more complicated than any other non-gelatinous, brown lichen discussed here, except perhaps *Physcia aquila* var. *detonsa* (Group 8) and *Pannaria microphylla* (Group 10), both with much narrower parts. *N. helveticum* is of thinner texture than the other members of Group 7. From all Shield Lichens (Groups 5 and 6) and Blister Lichens (Group 8) it can be distinguished by the dull blue-green color of the algal cells and their tendency to cling in chains. The Jelly Lichens (Group 11) have a gelatinous look when wet, and a much simpler microscopic structure. But *N. helveticum* will be difficult to determine with any certainty until it has been seen in fruit, which

removes all doubt. For distinctions between species of Nephroma, see *N. resupinatum*.

Nephroma laevigatum Smooth Swiss Lichen

A subspecies differing from *N. helveticum* in the absence of marginal or other growths from the upper surface, and of most of the down from the under. This lack makes it even more difficult to recognize, yet one already familiar with *N. helveticum* can name it at once. It should be studied in connection with that subspecies. There are also intermediate forms.

Nephroma parile. Powdery Swiss Lichen

A subspecies of *N. resupinatum* resembling *N. laevigatum* but with whitish, dusty soredia along the margins and clustered on the upper surface. This is the only local Nephroma having soredia. Found on trees in the north, perhaps not within the New York area.

(*Group 7 to be continued*)

Ridgewood, N. J.

BOOK REVIEWS

Trees of the South*

Arthur Harmount Graves

The situation with regard to books about trees seems to be similar to that concerning text books of botany. It would seem that every botanist who *is* anybody has written, is writing, or will write a text book of botany. And everyone knows that the books about trees are legion. And yet, as the Book of books says, "Of the making of many books there is no end."[1] I have always taken this as meaning not a countless repetition of the same old thing, but that new, and ever new, outlooks, new treatments of the subject

* Trees of the South. Green, Charlotte Hilton. Univ. of North Carolina Press, Chapel Hill, N. C. 551 p. $2.50.

[1] Ecclesiastes 12.12.

matter, new facts—or facts presented in a new way—are possible. The combinations and permutations here are as great or greater than they are in music or art. Do musicians or artists think that the field of composition has been or ever will be exhausted? Not at all: as long as there are different individuals, i.e., different personalities, there can always be something new. For, is not the book, the musical score, or the painting, in reality the *expression* of the individual?

The principal motif adopted by Mrs. Green, out of which she composes her charming symphonies, is the idea of companionship. The trees are our friends. They are our companions through life, and hence their peculiarities, likes and dislikes, their appearances at different seasons of the year, should mean something to us. Thus Mrs. Green (who is, in reality, a poet equipped with the requisite scientific knowledge) charmingly writes: "The dogwood is the 'loveliest lady of the wood,' lifting delicate tracery of bare branches tipped with silvery pearls that hold the promise of next spring's white bloom. The American elm is a stately matron with graceful, inviting curves and noble dignity. The beeches are the Quaker ladies of the forest, wearing sedately their smooth gray bark wrapped tightly about them. The sycamore is the white-haired dowager among trees, still vain enough to lean over woodland pools and admire her mottled reflection in the cool water beneath."

There are some who will fling gibes at all this. But why? Are there not other things in this world of ours beside cold, hard facts? One of the wisest men the world has ever known once said, "Everything has its beauty, but not everyone sees it."[2]

One must not get the idea from this that the book doesn't have the "cold, hard facts." It does, but they are treated in such a way that they don't seem cold and hard. Part 1 is devoted to the tree considered in a general way—its parts, its flowers, fruits, seeds and economic importance. Part 2 considers the different tree species by families: thus, the Willow Family, the Sweet Gale Family, the Walnut Family, the Beech Family, etc. The distinguishing characters of each species are clearly explained and graphically illustrated.

[2] Confucius (551–478 B.C.) Analects.

Mrs. Green's book also bring out many interesting things concerning the "folklore" of trees, a subject on which much remains to be written. In addition, this being a book on trees of the Southern States, many species are included with which we at the north are less familiar, such as the Chinaberry, the Crape Myrtle, the Loblolly Bay, the Silver Bell and Snowdrop trees (Halesia) and the Sweetleaf, besides the southern pines. In addition, of course, most of the trees of the north are described.

Mr. J. S. Holmes, State Forester of North Carolina, who, I am proud to say, was once a pupil of mine at the Yale School of Forestry, has written a splendid foreword. The illustrations, of which there are many throughout the book, are admirable. I do not see how they could be improved. It is, altogether a beautiful book, and it is a pleasure to have the opportunity of reviewing it.

Two New Books on Genetics

R. C. Benedict

Sturtevant and Beadle, An Introduction to Genetics*

"Genetics is a quantitative subject. It deals with ratios, with measurements, and with geometrical relationships of chromosomes. Unlike most sciences which are based largely on mathematics, it makes use of its own system of units." The preceding, the opening sentence of the Preface of Sturtevant and Beadle's new text, "An introduction to genetics," furnishes the keynote for the volume.

The book is significant in a number of ways. First, it is of interest to have a text-book treatment in formal genetics of which one of the authors was a chief collaborator with Morgan in establishing modern genetics. Second, it is important to have the point of view of genetics as a quantitative subject rigorously carried out in a book for class use. Third, the text is valuable for the recency and comprehensiveness of its factual data, and its discussion of their implications and applications. Recent advances in cytology during the past few years seem to have led to an enlarged understanding of the mechanics and significance of mitosis and

* An introduction to genetics. Sturtevant, A. H., and Beadle, G. W. G. W. Saunders. 1936. $3.25.

meiosis; these are discussed in this text. While the Sturtevant and Beadle is relatively short and compact, readers will not find that matters of general interest have been omitted; for example, there are twenty-three index references to human inheritance. Evolution is indexed only once, but the experimental bases upon which evolutionary changes are predicated, gene differences, polyploidy, etc., receive careful attention. One whole chapter is devoted to "species differences."

In line with its emphasis on the mathematical aspects of the subjects, most of the chapters end with a series of selected problems for the student. The illustrations, relatively few in number, bear chiefly on the critical features of chromosome structure and behavior, and on differences in color and structure in Drosophila.. An appendix contains an explanation of the mathematics of certain special problems. There is an extensive bibliography, and a brief but discriminating historical survey of the steps by which the cytogenetic basis of the gene concept of heredity was reached.

It appears certain that this text will be found essential for library reference, for maturer students of the subject, and for teachers in the field of biology. Its value as a specific text for class use will depend upon the level of the biological curriculum at which work in genetics is given, and the preliminary training set up as a prerequisite. Courses involving introduction to the principles of genetics are given through all the years of college undergraduate work and also as part of high school biology. Among the several textbooks by American authors, there is considerable range in difficulty and design; some like the Walter, the Shull, and the Snyder, are adapted for the more "popular" courses of the lower undergraduate years; others like the Castle, the Babcock and Clausen, and the Sinnott and Dunn, are better fitted for advanced undergraduate or graduate courses. The Sturtevant and Beadle belongs clearly in the latter group.

Waddington, An Introduction to Modern Genetics*

The thesis of this text by Waddington, "An introduction to modern genetics," is furnished by Bateson's original definition of the word, genetics, as quoted in the Introduction; as the science

* An introduction to modern genetics. Waddington, C. H. Macmillan. 1939. $4.00

whose "labours are devoted to the elucidation of the phenomena of heredity and variation; in other words to the physiology of descent." Further along the author expands this concept: "The three aspects of the temporal changes of organisms, heredity, development and evolution, are as intimately related as, for instances, physiology and biochemistry among the sciences which deal with the organisms as a going concern." The scope of the text is further explicitly shown by its division into parts: (1) Formal genetics; (2) Genetics and development; (3) Genetics and evolution; (4) Genetics and human affairs; (5) The nature of the gene.

Such a text naturally presents distinct differences from one designed primarily for "formal" genetics. The latter type of course calls for the intensive study of a few fields; the mastery of breeding techniques, of mathematical calculations, and of cytological data. A text in "genetics, evolution, and eugenics" must take into account a wide survey of biology, together with consideration of historical development as well. In the Waddington text, considerable parts are devoted to data from the fields of embryology, systematics, geographic distribution, palaeontology, and to such sociological aspects as population growth, differential birth rates, sterilization, etc.

Both the restricted and the broader types of genetics texts have their values and supporters, and both meet demands expressed by college courses of these types. The broader type of course is sometimes offered in sequence to a course in formal genetics; more frequently, it is independently given at more elementary levels of the curriculum. In such cases, it is sometimes presented without laboratory work, as a "survey" or "correlation" course.

The Waddington text, however, is not intended for use in any elementary grade of the college curriculum. Of about the same total number of pages as the Sturtevant and Beadle, it has, because of a larger page size and closer printing, at least fifty percent more textual material. In its discussion of the cytological basis of inheritance, of mitosis and meiosis and chromosome behavior, it is as recent as the other text and more extensive in detail. With an appendix describing methods of culturing Drosophila, it is obviously intended that the text will be used in a course involving formal laboratory work. While the discussion of evolutionary

principles is necessarily restricted, the theories considered are such as are derivable directly from objective data. There is little or no consideration of theories, no matter how significant, which depend on more philosophical generalization. Thus, emergent evolution finds no mention. The terminology is sometimes different from that commonly used in American texts; for example, the word, orthogenesis, is not used, although the principle is considered under the more or less synonymous terms, "trends" and "programme evolution."

The text is strongly recommended for library reference and for individual libraries, and also for courses in genetics and evolution when these are given at the upper undergraduate or at graduate levels.

Keys to the Phyla of Organisms*

George T. Hastings

This ambitious little publication arranges in order all of the phyla of plants and animals and those that are neither. Based chiefly on the systems of Bessey and Schaffner for plants, there are included the views of other outstanding authorities in regard to certain groups. The keys are as simple and definite as can be where a sentence or two must be made to characterize an order or phylum. Written for college students of plant morphology they can be easily followed by anyone with a general knowledge of biology and should be interesting and of value to everyone interested in the classification of plants and animals.

In the system of classification two kingdoms below plants (Phyta) and animal (Zooea) are recognized. Monera with two Phyla, the Archaeophyta, a hypothetical group to include the first living particles of primitive life and including viruses and bacteriophages if these are living, and the Schizophyta, including bluegreen algae and bacteria. The second kingdom, Protista, includes the slime molds, algae, fungi, protozoa and sponges. The plant kingdom, Phyta, is divided into nine phyla and the animal kingdom, Zooea, into twenty-one.

* Keys to the Phyla of Organisms. Fred A. Barkley. 40 pages, paper covers. Associated Student's Store, Missoula, Montana. 1939. $0.75.

Following the keys to the phyla, other keys are given to the orders of plants, including for convenience the phyla of the two kingdoms below the PHYTA. The arrangement of the orders follows closely the classification of Bessey, with the flowering plants, ANTHOPHYTA, divided into Dicotyledoneae and Monocotyledoneae, the first of these classes beginning with the order Ranales and ending with the Compositales—the Salicales, Fagales, Juglandales and other orders with simplified flowers coming well towards the end of the series, the second class begins with the Butomales and Alismatales and ends with Cyperales and Graminales.

A glossary to the terms used is given, an outline of the classification and a list of references to works on classification of plants and animals, chiefly, if we except the work of Bessey, works published in the last ten or twelve years.

FIELD TRIPS OF THE CLUB

TRIPS OF AUGUST 26 AND 27 TO THE WATCHUNG MOUNTAINS

Eleven members and guests were present on the trip of August 26 to Seeley's Notch, near Scotch Plains, N. J., and nine on the trip the following day to Wetumpka Notch and Washington Valley, near Plainfield, N. J. Four hundred and eighty-nine species and varieties of wild plants were identified, including 18 new records for the area, bringing the total for this small area now to 1,492, of which 82 percent are native and 18 percent naturalized. Species found for the first time in our area on these trips included the floating pondweed (*Potamogeton natans*) on Seeley's Pond, the slender knotweed (*Polygonum tenue*) on the exposed trap-rock cliffs, the starry campion (*Silene stellata*), the short-stalked false-pimpernel (*Lindernia dubia* var. *major*), the fragrant bedstraw (*Galium triflorum*), the low cudweed (*Gnaphalium uliginosum*), a recently introduced and rapidly spreading European sow-thistle (*Sonchus uliginosus*), two bush-clovers (*Lespedeza hirta* and *L. violacea*), and several fungi, *Coriolus nigromarginatus, Hapalopilus gilvus, Laetiporus speciosus, Irpex lacteus,* and *Hypholoma sublateritium*. The false-indigo (*Amorpha fruticosa*) reported by Mackenzie in 1921 and not reported since, was rediscovered,

as well as the very rare true ginseng (*Panax quinquefolium*), reported previously from the region only by Miller in 1915 and by Mackenzie in 1918 and not reported or found since. The mud-plantain (*Heteranthera reniformis*) reported by Wilson from our area in 1901 and by Johnson in 1934, was found in great abundance on Seeley's Pond. The red-berried elder (*Sambucus pubens*), never before seen on our trips to the region, although reported by Tweedy in 1879 and by Miller in 1915, was found, as well as the unexpected American cranberry-bush (*Viburnum trilobum*) the latter in full fruit. Other interesting plants observed were *Asclepias verticillata, Celtis crassifolia, Dioscorea paniculata, Elodea canadensis, Echinocystis lobata, Crocanthemum canadense, Desmodium canescens, Lespedeza frutescens, Lobelia siphilitica, Solidago flexicaulis, Tracaulon arifolium, Svida rugosa, Persicaria lapathifolia, Cuscuta gronovii* and *C. coryli, Laportea canadensis, Gerardia purpurea, Liatris spicata, Veronicastrum virginimum, Spiranthes cernua, Boehmeria cylindrica, Corallorrhiza maculata, Atragene americana,* and *Mentha gentilis.* Dittany (*Cunila origanoides*) and both species of yellow false-foxglove (*Aureolaria flava* and *A. virginica*) were found in bloom and splendid stands of the water-starwort (*Callitriche palustris*). Five kinds of wild-lettuce were observed in flower, *Lactuca spicata, L. canadensis, L. sagittifolia, L. virosa,* and *L. virosa* var. *integrata. Phaseolus vulgaris, Citrullus vulgaris, Aralia spinosa, Acer palmatum, Lepadena marginata, Baptisia australis, Lonicera morrowi,* and *Bignonia radicans* were found as escapes, and *Miscanthus sinensis* var. *variegatus, Ilex opaca,* and *Juglans regia* as persistents. Large numbers of Scotch pine (*Pinus sylvestris*) were observed invading fields in the manner of our native red-cedar. Ecological aspects of the flora were pointed out, including the story of how two native goldenrods have all but exterminated the Jerusalem artichoke (*Helianthus tuberosus*), probably introduced by the Indians, which a few years ago existed in very large pure-stand colonies in several spots in the area.

H. N. Moldenke

Trip of September 24 to Mineola, N. Y.

The trip was for Myxomycetes, to a densely wooded area of 40 acres in the foothills of the moraine, about two miles north of the village of Mineola. This locality, known as Albertson, is the

best small unit for Myxomycetes on Long Island, and in the past 15 years about 120 species have been found there. No matter what the weather has been prior to an outing, there is always something to see or find, and with good conditions on other occasions as many as 40 species have been observed fruiting at one time.

The party, consisting of 11 persons, met at the Mineola railroad station at 11 a.m. where cars were waiting to take them to the rendezvous. An inspection of some manure piles yielded *Fuligo cinerea* (Schw.) Morg., usually found on such habitats, together with some associated species. After that came lunch under a spreading tree, during which Mr. Charles E. Mohr of the Philadelphia Academy of Natural Sciences displayed a number of beautiful transparencies of Myxomycetes that he had photographed in natural colors; Mr. Frank G. White exhibited specimens collected by him during the summer; and I explained the characters of about 25 rare or interesting forms found in the Great Smoky Mountains National Park in August. The afternoon was spent in roaming through the forest, examining rotten logs, brush piles, and dead leaves, which search brought about 20 species in all, less than usual, because the drought of the preceding summer was not conducive to the abundant appearance of the fruiting bodies. Noteworthy examples among the forms collected were *Physarum leucopus* Link, a new record for Long Island; *Physarum bogoriense* Racib., which has been found only once before on Long Island; and splendid developments of the beautiful *Physarum melleum* (Berk. and Br.) Massee. The most interesting features of the trip were the field observations on the species *Physarum polycephalum* Schw. During our visit to the same area in June, a development of the common oyster mushroom was noticed on the sides of a tree about 15 feet from the ground. One of the party climbed the tree and brought it down when it was found to be covered with the yellow plasmodium of an unknown slime-mold. Several of the party who took portions of the plasmodium reported to me that it had developed sporangia of *P. polycephalum*. During the present foray many specimens of the oyster mushroom were observed, and in almost every instance the plasmodium was feeding thereon, or it was covered with the fruiting bodies in various stages of maturity. Finally a mushroom was found close to the ground with a large plasmodium transforming itself into fruit, and the mature

sporangia of *P. polycephalum* spreading away on leaves and twigs. It was a sight to be remembered by those not familiar therewith.

These trips are not so much for the purpose of obtaining a large number of specimens, although this is often the case with good conditions, but to instruct members in the field habits and life history of the Myxomycetes, and also teach them proper methods in seeking the fruiting bodies. When this knowledge has been acquired, it will be possible to find them in all suitable situations at the proper time. They are common and abundant although rarely collected by the untrained mycologist.

ROBERT HAGELSTEIN

PROCEEDINGS OF THE CLUB

MINUTES OF THE MEETING OF OCTOBER 3, 1939

The meeting of the Torrey Botanical Club held at the Brooklyn Botanic Garden on October 3, 1939, was called to order by the President, Dr. Arthur H. Graves at 8.30 p.m.

Twenty-eight persons were present.

The following persons were elected to membership: *Annual*—Miss Clara Burghart, 419 Devon St., Kearny, N. J.; Dr. Alberto Castellanos, Museo Ciencas Naturales, Chubut 450, Buenos Aires, Argentina; Dr. Horacio R. Descole, Miguel Lillo 205, Tucuman, Argentina; Mr. Charles Ericson, 101 West 78th St., New York, N. Y.; Mr. Louis E. Hand, 8061 Fairview St., Holmesburg, Philadelphia, Pa.; Miss Edna J. Malone, 3045 Palisade Ave., New York, N. Y.; Prof. Henry Pittier, P. O. Box 255, Caracas, Venezuela; Dr. H. W. Rickett, New York Botanical Garden, Bronx Park, New York, N. Y.

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Taylor, 2685 Boulevard, Jersey City, N. J.; Mr. Arthur E. Woods, Cecil Lane, West Orange, N. J.

The resignation of Dr. Ralph R. Stewart, Gordon College, Rawalpindi, India, was reported and noted with regret.

The program consisted of vacation and collecting experiences of the club members and their friends.

After the program delightful refreshments were served by the Brooklyn Botanic Garden.

CLYDE CHANDLER
Recording Secretary

NEWS NOTES

The Brooklyn Botanic Garden has been asked to send details of its plans and landscaping together with information as to its educational and scientific program to the Minister of Agriculture of Egypt. A new botanic garden to be established in connection with the King Fuad University of Cairo will be planned along the lines of the Brooklyn garden.

Mr. R. T. White, of the U. S. Department of Agriculture's Japanese Beetle Research Laboratories at Moorestown, N. J., has announced that experiments carried on since 1934 with spore-forming bacteria have been successful in destroying the beetles. As the bacteria will exist in soil almost indefinitely and infect any beetle larvae that develop there it seems to be the most effective and economical method of controlling the beetles.

Dr. William H. Brown, an authority on tropical plants and lecturer in botany at Johns Hopkins University, died in Baltimore on November 9. He was fifty-five years old. In 1911 he went to the Philippines as plant physiologist of the Bureau of Science. He was director of the Bureau from 1924 to 1933. He was the author of Vegetation of the Philippine Mountains, A Text-book of General Botany, and The Plant Kingdom.

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Volume 40 March-April, 1940 Number 2

TORREYA

A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

Vol. 40 March-April, 1940 No. 2

A Shady Lane

Grace L. Clapp

Some few dirt roads leading off from concrete highways are worth the attention of the passerby.

One such has been a shady lane for over fifty years. In those earlier days Virginia rail fences topped both of its siltlike slopes. Cows were pastured in the grassy apple orchard at the north while tobacco or potatoes and vegetables were raised in the lot on the south. At that time pussy willow, fragrant grapevines, chokecherry and chokeberry, small elms along the fences, formed two green hedgerows in summer. On the north side, 210 feet from a farmer's driveway, stood two big chestnut trees, and opposite the larger was a red maple. In the autumn the burrs fell among yellow brakes and the nuts were half hidden among the mosses. A few blueberries and small blackberries ripened under the maple.

Seasonally the selectman's helper cut the bushes because their wet foliage and branches brushed against an occasional passing carriage. Cutting is still continued in late summer before the "hay fever" season comes on.

Chestnut trees, apple orchard and gray fences disappeared long ago but the big red maple (now 9½ feet in girth 3 feet from the ground) remains. One large elm has grown up on the north side of the lane.

Within the past 20-25 years, the farmer set out a row of hemlocks (7) and spruces (2) along the top of the south ridge. Within 5 years he has added white pines (11) filling the space between the older evergreens. Two big apple trees close to his driveway help to make a continuous shade for the northfacing bank in summer. In spring it holds ice and snow about two weeks longer than the sunfacing slope—much as in a forest ravine.

The slopes, discounting the road ditch of varying width and depth, are about 8 feet wide and are covered with a mass of compact foliage apparently made up of ferns. However, a surprisingly

large number of other plants grow with them as shown in the following estimate made in July.

NORTH AND SOUTH BANKS

Acer rubrum N(1) S(5)
Amelanchier canadensis N(3) S(1)
Betula populifolia N(60) S(5)
Corylus americana N(2) S(1)
Ligustrum ibota N(1) S(3)
Prunus serotina N(45) S(16)
Prunus virginiana N(31) S(1)
Pyrus malus (var. ?) N(3) S(1)
Quercus palustris N(22) S(3)
Quercus velutina N(2) S(1)
Rhus Toxicodendron N 2 S 3**
Rubus hispidus N 3 S1**
Spirea latifolia N(21) 3 S(3)*
Ulmus americana N(2) S(3)
Viburnum dentatum N(2) S(1)
Vitis labrusca N(2) S(1)
Lactuca canadensis N(2) S(2)
Maianthemum canadense N 1 S 1**
Poa pratensis N 1 S 1**
Prenanthes alba N(2) S(1)
Polygonatum giganteum N(1) S(1)
Asplenium Filix-femina N(3) 6 S(3) 8**
Lycopodium obscurum v. dendroideum N 1 S 1**
Onoclea sensibilis N 2 S(5)*
*Osmunda Claytoniana N(15) S 8**
Polytrichum commune N 1 S 1**

NORTH BANK

Acer dasycarpum (2)
Aronia atropurpurea (1)
Clematis virginiana (2)
Cornus florida (3)
Cornus paniculata (1)
Gaylussacia baccata (8)
Leucothoe racemosa (4)
Pinus Strobus (6)
Populus deltoides (1)
Psedera quinquefolia (1)
Rosa humilis (1)
*Rubus villosus 3**
*Rubus (sp. ?) 1**
Salix discolor (1)
Spirea tomentosa (1)
Vitis cordifolia (?) (1)
Achillea Millefolium (3)
Andropogon scoparius (25)
Asclepias seriaca (3)
Aster cordifolius (4)
Aster laevis (4)
Bartonia virginica (9)
Desmodium (sp. ?) (5)
Eupatorium purpureum (1)
*Hieracium canadense 1**
*Houstonia caerulea (1)**
*Lysimachia quadrifolia 1**
*Panicum (sp. ?) 1**
*Polygala sanguinea 1**
Potentilla canadensis (5)
*Pycnanthemum lanceolatum 3**
Solidago lanceolata (5)
*Solidago rugosa (20) 1**
Viola sagittata (6)
*Pteris aquilina 6**

SOUTH BANK

Berberis Thunbergii (2)
Carya ovata (1)
Fagus americana (1)
Robinia Pseudo-Acacia (1)
Tsuga canadensis (21)
*Vaccinium pennsylvanicum 1**
*Aralia nudicaulis 1**
*Erythronium americanum 1**
Geranium maculatum (1)
*Hydrocotyle americana 3**
Lysimachia Nummularia (1)
*Polygonatum biflorum 1**
Ranunculus abortivus (1)
Sedum purpureum (4)

Taraxacum officinale (1)
Thaspium aureum (1)
*Oakesia sessilifolia 1**
*Viola cucullata 1**
*Aspidium Thelypteris 3**
Aspidium noveboracense (1)
*Dicksonia punctilobula 7**
*Lycopodium clavatum 1**
*Lycopodium complanatum 1**
Osmunda cinnamomea (1)
Osmunda regalis (1)
Polystichum acrostichoides (2)

() Individual plants.
* Colonies.
Note—Gray's Manual 7th Edition was used for plant determinations.

Doubtless other areas of equal extent on country roads surpass this in number of varieties but as a meeting place of plants from different habitats it presents an interesting spot for study for here are found:

1. Conditions for successful germination of hemlocks.
2. A distribution of plants somewhat determined by light conditions.
3. The formation of new colonies and continuation of old ones.
4. An establishment of garden species among the native plants.
5. Plant dissemination carried out by many different means.

Can we not find many of our highways still offering opportunities for study of plant life for our young people?

WINDSOR LOCKS, CONN.

Further Notes on Communities of Blue-Green Algae

Helen Foot Buell

In two previous papers[1] the author described a fresh-water community of blue-green algae collected in Minneapolis, Minnesota. This community develops in bottom ooze and later floats to the water surface. It is a globular, gelatinous mass, disagreeable in odor, varying in color from greenish-black to black or reddish-black. The community consists of an outer layer composed of species of Oscillatoriaceae, some having a violet color, and surrounding an oozy inner portion containing pseudo-vacuolate, unicellular Cyanophyceae. As far as I know there have been no other published reports of such communities.

During the summer of 1938, however, collections were made[2] in Lake Itasca, Itasca Park, Minnesota, of communities which are practically identical with those previously described. They appeared likewise to be developing in similar situations—bays of the lake 10 to 20 feet deep, offering some protection against water movement, and having the bottom composed of a deep deposit of fine black mud. These communities were from 2 to 5 cm. in diameter, somewhat smaller than those found earlier at Minneapolis, which were from 2 to 8 cm. and occasionally 12 cm.

There appears, however, to be a slight dissimilarity in the temperature conditions under which the communities develop. As far as was determined, the Minneapolis communities never developed at mean temperatures lower than 21° C., and those having a reddish-black color, dominated by violet-colored Cyanophyceae, developed only at temperatures 2 to 3° higher. The Lake Itasca communities were reddish-black in color and were composed mainly of violet-colored Cyanophyceae. The mean temperature for the period beginning 10 days prior to their first observance and ending the last day of their observance (i.e., from July 28 to August 16) was 22° C., indicating development at slightly lower temperatures than

[1] Buell, H. F. A community of blue-green algae in a Minnesota pond. Ecology **19**: 224-232. 1938.

———. The taxonomy of a community of blue-green algae in a Minnesota pond. Bull. Torrey Bot. Club **65**: 377-396. 1938.

[2] By Dr. Murray F. Buell and students at the Biological Station of the University of Minnesota at Itasca Park, Minn.

in Minneapolis, and suggesting the possibility that some other factor, such as light, may also be critical.

Dr. Samuel G. Eddy of the Department of Zoology, University of Minnesota, states that he has frequently observed macroscopically similar communities in various other parts of Minnesota.

Department of Botany,
North Carolina State College,
Raleigh, N. C.

Algal Communities in Tully Lake

George T. Hastings

During a number of summers spent at Tully Lake, Onondaga and Cortland Counties, N. Y., communities similar to those described by Mrs. Buell were observed in August and notes and drawings made. The lake has a maximum depth of about thirty feet and has a soft white marl bottom. These floating colonies always appeared in the deeper parts of the lake. Above the surface they appeared as hemispheres 2 to 3 cm. across, below water extended a skirt-like mass 7 to 10 cm. deep and about as much across. These masses were made up chiefly of a species of *Spirulina,* the individual trichomes about 2 mm. long, with some species of *Oscillatoria,* small colonies of *Microcystis,* various diatons and protozoa.

Guide to the Lichens of the New York Area—Part 6

G. G. Nearing

Group 7—*continued*

Solorina saccata. Dimpled Lichen

This northern lichen is rare in the New York area, but has been found growing on the ground in the Helderbergs, near Albany. It looks like a brown Sticta or Peltigera, into which someone has pressed the round end of a bullet here and there, then colored the smooth, cup-like depressions reddish brown. These peculiar sunken fruits are unlike any other lichen, except the smaller *Heppia Despreauxii* (Group 13), and as the species is usually fertile, no further description is needed to determine it. Sometimes the lichen is reduced to a mere rim 2 or 3 mm. wide around its sunken fruits.

Peltigera. Leather Lichens having the downy under surface marked by thickened, often darkened veins. The fruits form on the *upper* surface of special lobes which project from the tips. Spores are brownish until mature, when they become colorless.

Peltigera canina. Dog Lichen

Found everywhere growing on the ground or over mosses on tree-roots and rocks. It reaches best development in the dense shade of damp woods, or on stream-banks, but may also be seen in dry, open places, exposed to full sun. It spreads in regular or irregular rosettes as much as 50 cm. or more across, with branches and tips sometimes 4 cm. wide. The tips often rise 2 or 3 cm. clear of the foothold. The upper surface is leather-brown or gray, greenish when moist, blackish in winter, rather smooth, but with small hairs scattered inconspicuously. Or the margins and other parts may be covered with tiny lobes and coral-like growths, or with soredia (in the subspecies). The under surface is downy, white to brown, more or less covered with a network of thickened, white, brown or blackening veins. From these veins spring similarly colored, cottony holdfasts, often 1 cm. long and frequently much thickened and branched. Algal cells said to be Nostoc or Gloeocapsa, but difficult to determine.

Fruits are not uncommon, usually renewed every summer, maturing in autumn. The special, narrow lobes spring upward from the tips, at first curling to form a hood over the young fruits. Later the fruits become flat on the upper surface of their lobes, and often finally roll into a cone with the chestnut-brown or blackening fruiting surface outward. Spores when mature, colorless, 4- to 8-celled, extremely variable in size, but usually 40 to 70 by 3 to 5 microns.

Peltigera canina when fruiting will hardly be confused with any other lichen except its own subspecies, which may be ignored, or separated as indicated in following paragraphs. From *P. aphthosa,* a distinct species, it may be distinguished by the color, remaining brown, gray or dark olive green when wet; also by the absence of peculiar small, fruit-like bodies scattered over the upper surface, described under that species. *P. aphthosa* and *P. venosa* have the algal cells Protococcus. From species of Sticta and Nephroma, it can be separated by the thickened veins, though there are forms of the subspecies *P. malacea* in which the brown veins are so closely interlaced that they seem to lose their identity, and the pale spaces between them appear like the speckling of a Sticta. These rare forms cannot be determined surely unless fruits are present. Associated with *Peltigera canina* along stream beds will be found *Dermatocarpon aquaticum* (Group 12), smaller in its parts, and turning rather bright green when wet. In texture it is rather leathery, but there are no thickened veins beneath. *Hydrothyria venosa* (Group 11), a blackish lichen often found under water, has veins beneath, but is thin and delicate, and gelatinous looking when wet. *Leptogium saturninum,* a slate-gray gelatinous lichen of Group 11, is clothed on the under surface with a nap of rather long, fine hairs, but has no veins. Few other lichens could cause confusion, especially as the larger forms are the largest of all our papery lichens.

The subspecies of *Peltigera canina* are unsatisfactory and inconstant in their characters, but are here briefly described for those who wish to study them.

Peltigera horizontalis is a subspecies with shortened fruit-lobes, often so short that the fruits appear to rest on the pointed tips rather than on special lobes. They are flat, broader than long, and held in a more or less horizontal position, instead of pointing up-

ward as in typical *P. canina.* The spores, only 4-celled, and 30 to 48 by 5 to 8 microns, are shorter and broader than in other subspecies, whose spores are rarely shorter than 40 or broader than 6 microns. The conjunction of all these characters is rare, but forms of *P. canina* will often show one or more of them.

Peltigera polydactyla appears to have been named for its clustered, slender fruit-lobes. Its spores also are longer than in other subspecies, 60 to 100 by 3 to 4 microns. Unfortunately the two characters are seldom associated, and there appears to be no sound foundation for the name.

Peltigera scutata is a subspecies having margins dotted with gray soredia or divided into coral-like growths. Otherwise not different from *P. canina.*

Peltigera malacea is a subspecies with the under surface mostly brown, and the veins so run together as to be hardly distinguishable. Toward the tips, small, pale spaces, showing between, suggest the speckling of *Sticta scrobiculata,* and specimens not in fruit are sometimes mistaken for the Sticta, even by expert lichenists. The spores are 50 to 72 by 4 to 6 microns, being broader than in any other subspecies except *P. horizontalis.* They are divided into 4 or 6 cells, but never into 8, as most of the forms often are. These characters are not usually associated, and there seems little foundation for the name.

Peltigera rufescens is a subspecies hardly distinguishable from *P. canina,* with narrow lobes and crinkled margins. The under surface is brown, with darker brown veins.

Peltigera spuria, also called *P. canina* var. *spuria,* is merely a depauperate form, probably due to insufficient shade and moisture. It is usually pale gray, with rather small, usually blackish fruits. The under surface is whitish, with whitish veins and holdfasts. These characters are not particularly distinct, but there is an extreme form, *P. spuria* var. *sorediata,* also called *P. erumpens,* that requires separate description. Instead of the branching, rosette habit of growth, it is often seen as almost unconnected, roundish lobes, with margins curled upward. These may be deeply saucer-shaped, and sometimes less than 1 cm. in diameter. The upper surface may be pale gray or brownish, spotted with oval patches of blue-gray, granular soredia, each up to 5 mm. across. The under surface is whitish, with a few whitish veins and holdfasts. It will

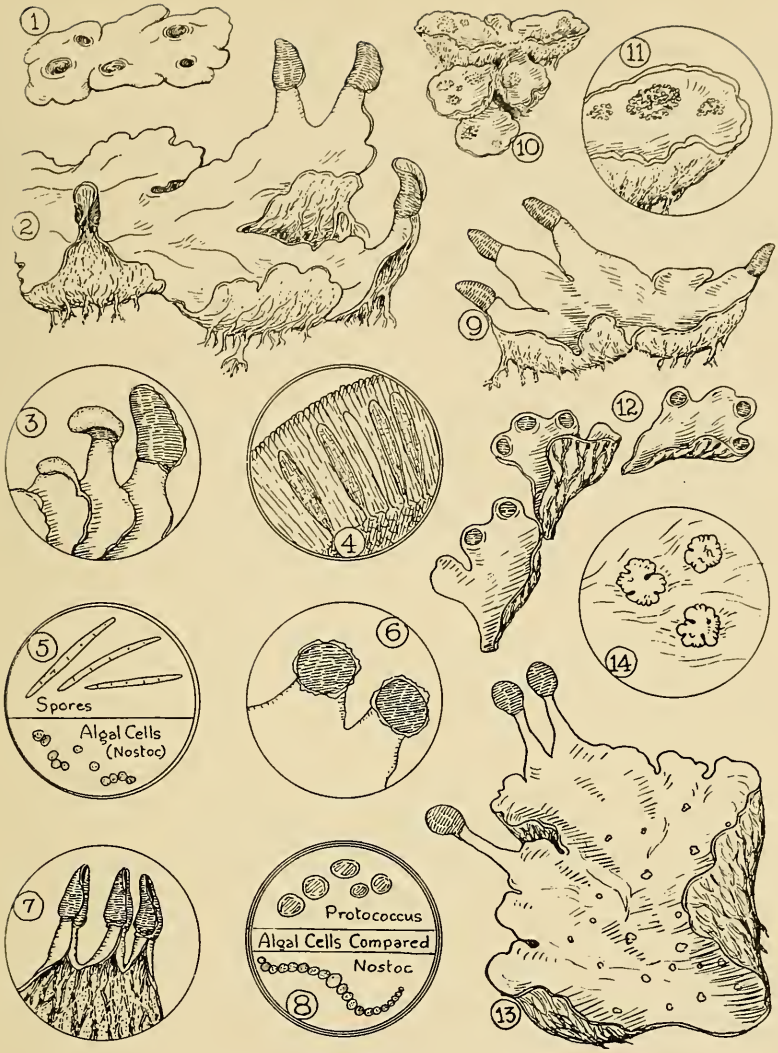

PLATE 10

Fig. 1. *Solorina saccata*, brown.

Fig. 2. *Peltigera canina*, leather-brown or gray.

Fig. 3. *P. canina*, fruiting lobes showing progressive stages of development.

Fig. 4. *P. canina*, section of spore layer.

Fig. 5. *P. canina*. spores.

Fig. 6. *P. horizontalis*, fruiting tips.

Fig. 7. *P. polydactyla*, under surface and fruiting lobes.

Fig. 8. Algal cells, Protococcus and Nostoc.

Fig. 9. *Peltigera spuria*, whitish or pale gray.

Fig. 10. *P. spuria* var. *sorediata* (*P. erumpens*), with blue-gray, granular soredia.

Fig. 11. *P. spuria* var. *sorediata*, tip.

Fig. 12. *P. venosa*, gray or brownish.

Fig. 13. *P. aphthosa*, gray or brown, bright green when moist.

Fig. 14. *P. aphthosa*. cephalodia.

be seen rather commonly in exposed rocky fields, on the ground or sometimes on rotten wood, or scattered over mosses. At first sight it would hardly be associated with Peltigera, but the downy under surface with thickened veins shows its relationship, and serves to distinguish it from *Dermatocarpon miniatum* (Group 12) which has a dark under surface with no down nor regular veining.

Peltigera venosa. Fan Lichen

Found only occasionally growing on the ground. It is not a rosette-shaped lichen, but consists of irregular, isolated fans, usually less than 2 cm. across, the tips lifted as much as 1 cm. above the soil. The upper surface is smooth, greenish gray or sometimes brownish, the under whitish, conspicuously marked with radiating, dark brown, thickened veins, somewhat downy. Algal cells Protococcus.

Fruits are frequent, reddish brown, nearly circular, placed on short lobes, or merely on the upper surface of the fans, close to the undulating margins. Spores colorless when mature, 4-celled, 28 to 46 by 6 to 10 microns.

Peltigera venosa is easily distinguished from other species of Peltigera by its small size and fan-like shape, and from all but *P. horizontalis* by the roundish fruits held nearly horizontal on very short lobes. From *P. spuria,* also of small size, and sometimes consisting of scattered lobes, it is marked by the dark veins of the under surface, those of *P. spuria* being white or very pale gray. The presence of Protococcus, the bright green algal cells, distinguishes *P. venosa* from the other species except *P. aphthosa.* No other lichen could easily be confused with it.

Peltigera aphthosa. Studded Leather Lichen

Growing in deep woods, on mossy banks or rocks, usually at high elevations, but nowhere common. It spreads in irregular rosettes 20 cm. or more across, with lobes up to 5 cm. wide. The upper surface is smooth or wrinkled, olive-green, leather-brown or gray when dry, apple green when moist. The under surface is downy, pale brown or buff, with prominent dark brown or blackish, thickened veins, and ragged holdfasts colored like them. Studded over the upper surface are darkening gray, roundish bodies called

cephalodia, up to 1 mm. in diameter, with radiating teeth along the edge. Algal cells free (Protococcus).

Fruits borne on the tips of special, narrow lobes, and may be somewhat rolled or flat, up to 8 mm. across, reddish brown. Spores 4- to 8-celled, 45 to 75 by 4 to 7 microns, colorless when mature.

Peltigera aphthosa, at a glance, looks much like *P. canina,* but on close inspection, differs sharply. The cephalodia on the upper surface are unlike any of the growths commonly seen on our Papery Lichens. This is also the only species with thickened veins whose upper surface turns bright green when wet, and unlike *P. canina,* it keeps its color in winter. *Sticta amplissima,* though turning green when wet, has no veins beneath. Few other lichens grow large enough to cause confusion. The Rock Tripes (Group 12) often have dark bodies and black fruits scattered over the surface, but their circular shape, scarcely lobed, and single, central point of attachment distinguish them at once.

(Group 8 will contain the papery species of Physcia, including Anaptychia and Pyxine)

RIDGEWOOD, N. J.

Pronouncing Lichen Names

W. L. DIX

The recent revival of interest in the study of lichens among members of the Torrey Botanical Club has brought with it the apparent need of some assistance with the pronunciation of the scientific names. This need is all the more real because of the complete lack of any information in any available work on lichens, as well as the absence of common names for most of the species.[1] The following list is an attempt to supply this information for the genus Cladonia, and for other lichens as far as they have been described in the helpful articles by Mr. Nearing now being published in TORREYA.

Although scientific botanical names are either Latin and Greek derivatives or compounded from those languages, the English pro-

[1] The recent articles in TORREYA by Mr. Nearing on Lichens in the New York Area is an attempt to supply this lack of common names.

nunciation is generally used.[2] However, the rules for the accent and the length of vowel sounds depend to some extent on the rules for Greek and Latin. Most important is the rule that the accent falls on the next to the last (penult) syllable, if that syllable is long; and if the penult is not long, the accent falls on the previous (antepenult) syllable.

The penult is long, and therefore accented, in the following suffixes: alis, ana, aris, ata, ota, uta, and generally ina. The diphthong æ, pronounced like e in cede, is long.

The penult is short in the following endings, and the accent goes back to the antepenult: ilis, ica, ola, and ula.

Generally, vowel sounds and consonant values are the same as in English. However, c is sounded like k, except before e, i, and y, where it is sounded like s; g is sounded like j before e, i, and y.

In the following list of words the accented syllable is indicated by the usual mark. If the letter before it is a consonant, the vowel with it is pronounced short, as in fat, met, sit, lot, and nut; if the letter before the accent mark is a vowel, that vowel has the long or broad sound, as in fate, mete, site, note and lute. Both the short and the long vowel sound is often modified by the consonants following it, especially in the case of *r*. Full pronunciation for a few of the more troublesome words has been indicated with the symbols of English dictionaries.

The writer wishes to acknowledge the assistance of Mr. J. J. Nearing, Dr. A. W. Evans, Mr. C. A. Weatherby and Mrs. Gladys P. Anderson in the preparation of this paper, although in a few instances he has not followed their preferences.

Alecto'ria
  juba'ta
  chalybeiformis (kal-i-bi-for'mis)
  sarmento'sa
Cetra'ria
  aleurites (a-lu-rī'tes)
  aures'cens
  cilia'ris
  fahlunen'sis
  Fend'leri
  glau'ca
  hias'cens

[2] Lichen students who prefer to use the classic Greek and Latin pronunciation should avoid the too common error of a combination of the two methods. Also, it should be remembered that the scientists who adopted or formulated the scientific names for plants were not always Greek and Latin scholars. Moreover, most of them were not acquainted with English as a spoken language. How these names would be pronounced in English never occurred to them. Consequently, usage rather than rule has in some cases determined English pronunciation.

islandica (īs-lănd'ĭ-ka)
juniper'ina[3]
lacuno'sa
Oakesia'na
placoro'dia
pinas'tri
seapincola (se-pĭn'ko-la)

Clado'nia
abbreviat'ula
acumina'ta
alpes'tris
alpic'ola (al-pik'o-la)
amaurocrae'a
apodocar'pa
bacillaris (băs-i-lā'ris)
Beaumon'tii
bellidif'lora
borbon'ica
Bo'ryi
botry'tis
brev'is
ceaspiticia (sēs-pi-tish'i-a)
cario'sa
carolinia'na
carne'ola
ceras'pora
chlorophaea (klo-ro-fē'a)
clad'ina[3]
clavulif'era
coccifera (kŏk-sĭf'e-ra)
conis'ta
coniocraea (kon-i-o-krē'a)
cornu'ta
cornutoradia'ta
corymbos'ula
crispa'ta
cristatel'la
cyanipes (sī-ăn'i-pēs)
decortica'ta
defor'mis
degen'erans
did'yma
digita'ta
elonga'ta
exasperula'ta
ficorona'ta
fimbria'ta
Floerkea'na
florida'na
folia'cea
furca'ta
glau'ca
gracilescens (grās-i-lĕs'ens)
gracilis (grās'i-lis)
Gray'i
Herr'i
impex'a
incrassa'ta
lepori'na
lepido'ta
leptothal'lina[3]
macilen'ta
mateocy'atha
microphylli'za
mi'tis
mit'rula
multifor'mis
nemox'yna
Norr'lini
ochrochlo'ra
palamae'a
paludic'ola
papilla'ria
piedmonten'sis
pity'rea
pleuro'ta
polycar'pia
pycnoclada (pĭk-nŏk'la-da)
pyxida'ta
rangiferi'na
Ravenel'ii
reticula'ta
santen'sis
scabrius'cula

[3] If we accept the rule that the i in ina is short when used as a suffix referring to time, material, or inanimate substances, we must accent the antepenult, as cládina. However, usage sometimes accents the penult in disregard of the rule.

squamo'sa
strep'silis
sylvat'ica
symphicar'pa
subsquamo'sa
ten'uis
tur'gida
uncia'lis (un-sī-ā'lis)
verticilla'ta
vulca'nica

Ever'nia
prunas'tri
furfura'cea
clado'nia

Nephro'ma
resupina'tum
helvet'icum
laeviga'tum
par'ile

Parme'lia
ambig'ua
Bor'reri
capera'ta
centrif'uga
cetra'ta
colpo'des
consper'sa
crini'ta
frondif'era
hypot'ropa
incur'va
oliva'cea
perfora'ta
perla'ta
pertu'sa
physodes (fĭs'o-dēs)
rudec'ta
saxat'ilis
sulca'ta
tilia'cea
vitta'ta

Peltig'era
aphthosa (af-thō'sa)
cani'na
horizonta'lis
mala'cea
polydac'tala
rufescens (ru-fĕs'ens)
acu'ta
spu'ria
veno'sa

Physcia (fĭs'i-a)
cilia'ris
como'sa
his'pida
leucomela (lu-kŏm'o-la)

Ramali'na
calica'ris
farina'cea
fraxin'ea
pollina'ria

Solori'na
sacchata (săk-ā'ta)

Stic'ta
amplis'sima
anthras'pis
aura'ta
croca'ta
fuligino'sa
pulmona'ria
querci'zans
scrobicula'ta
sylvat'ica

Telochis'tes
chrysophthalmus (kris-of-thăl'-mus)

Us'nea
barba'ta
flo'rida
hir'ta
plica'ta
tricho'dea

MORRISVILLE, PA.

LOCAL FLORA NOTES

New Plant Immigrants in the New York Area

Mary Holtzoff

When I began to study the American flora, I was very much surprised to find so many plants familiar to me. I thought at first that the flora of America did not differ from that of Europe.

But soon I found that many plants immigrated to America from the Old World.

During my research work in 1923 I found a new plant of the Umbelliferae which is not reported in any American manual of botany. It is *Falcaria vulgaris L.* Its umbels are thin and white; the umbels and the umbellets bear a few linear bracts; fruits (carpels) are long and thin.

The chief characteristic of *Falcaria vulgaris* is in its leaves: they are three-parted; each part divided into three long linear leaflets, finely and sharply serrate. The plant is tall and very deeply rooted. I found it from 1923 to 1938 in an empty lot in the Bronx, New York City; it was spreading on sandy hills, among weeds; at the same locality some of it grew on sandy plains. Now it is disappearing from that place, but is spreading to the north and east.

Falcaria vulgaris is native of northeastern Europe and Asia, where it is fairly common. In Russia, it is found from the Oka River to the Black Sea.

I found two other plants: one, *Cakile maritima L.*, of the Cruciferae, was seen here in New York about 1870 at 40th Street, Manhattan, and disappeared. I found it again in Asbury Park, N. J., in 1920 in a sandy place near the shore, growing with *Cakile americana,* and in 1923-1926 I found it in the eastern part of the Bronx near 172nd Street on small sandy hills along some sidewalks, growing among weeds. It has again disappeared.

Cakile maritima L. differs from *Cakile americana* by its leaves, which are thread-like, the flowers, which are pinkish blue, and by the fruits. The fruits are small oval two-jointed pods, pointed at the top, and with two ears at the bottom, one on each side. *Cakile maritima* is native of Europe. It grows in Germany, France and England, and occasionally it is found as far north as Leningrad, Russia. There it is known under the name *Bunias maritima.*

The other plant which I found 1923-1930 is *Ononis repens L.* It was trailing on an empty sandy lot in eastern Bronx, in the vicinity of Westchester Avenue. The single pink flowers at the axils of the leaves are typical of the Papilionaceae, the ten stamens are monodalphous; the leaves are small, single, egg-shaped and finely toothed.

In his Botanico-geographical review, N. Kaufman, Professor of Botany in University of Kiev, Russia, says that plants like Ononis are not easily spread, as their fruit is a one-seeded legume; the seeds are few and too heavy to spread, and they have no adaptations for dispersal. In its own habitat, eastern Europe, Ononis is not plentiful. These new plants were seen by the late Dr. John K. Small and more recently by Mr. E. J. Alexander.

New York City.

Some Uncommon Adventives in Berks Co., Pennsylvania

Hans Wilkens

Eulalia viminea (Trin.) Kuntze. Very abundant for a distance of about a mile on both sides of the road following Wyomissing Creek, in Wyomissing, a suburb of Reading. It was first noticed in 1938, but must have been established for some time, to judge by the area covered. Unlike the form of this species found in Tennessee this has awned spikelets.

Digitaria sanguinalis (L.) Scop., var. *ciliaris* (Retz.) Parl. A form of crab-grass with the sterile lemma fringed with stiff spreading bristles. Along the railroad tracks in Fleetwood, northeast of Reading. First noticed in 1931, it has persisted, but not spread much. The same form was collected along railroad tracks in Washington, D. C., in 1937, and, no doubt, grows in similar situations elsewhere.

Thlaspi perfoliatum L. Found in two places, north and northeast of Reading, in 1935. No new colonies have been seen since.

Erucastrum gallicum (Willd.) O. E. Schulz. Found on a steep bank along a recently improved road near Centerport, northwest

of Reading, in 1936. It has persisted since. *Diplotaxis muralis* and *Euphorbia dentata* have been found near-by.

READING, PA.

Extension of Range of Cladonia floridana

The following paragraph was contained in a letter from Mr. Raymond H. Torrey dated December 9, 1937:

"A curious example of how little is known about some plant ranges, is shown by a discovery I made, along the path described, to the Ice Caves east of Ellenville, N. Y., of great quantities of *Cladonia floridana.* This lichen was first found in Florida, about 100 years ago and named *floridana,* for that reason. Older lichenists accepted that supposed limitation of range. But within the past ten years, with wider collecting by students of the genus, it has been found along the coastal plain, in Maryland, southern New Jersey, Long Island, and about Buzzard's Bay, Mass. But C. M. Robbins, in a paper on the species, in Rhodora, a few years ago, described it as a "coastal plain plant." Yet we now have it from the Shawangunks, at 2,200 feet! Suggests some analogy with the presence of *Corema Conradii,* otherwise a coastal plain plant, on Gertrude's Nose, about 1500 feet."

DANIEL SMILEY

Cladonia alpestris Near Lake Shehawken

Cladonia alpestris is rare enough in the Torrey area to warrant notice. A single small biscuit about three inches in diameter was found in Scott Township, about one mile north of Lake Shehawken, Wayne County, Pa. The determination has been confirmed by Dr. Evans who reports that it is the only specimen in his collection between the New York area and one in West Virginia. It grows on an open hilltop at an elevation of 2100 feet.

At Lake Shehawken I have also found an extensive colony of *Cetraria islandica.* Its average height here is about two inches. It is in an old unploughed pasture in light shade and open field, facing south-east, and at an elevation of 1850 feet.

W. L. DIX

BOOK REVIEWS

California Shrubs*

G. T. Hastings

With an area about one-third that of the region covered by Gray's Manual California has twice as many shrubby plants. But the number of species, some 800 with 200 varieties are described in this manual, gives little idea of the importance of shrubs in the landscape of California. The deserts and sage brush regions cover large areas in the central, southern and western parts of the state; chaparral forms the "Pygmy Forest" covering the mountain slopes from San Francisco south, with extensions on the mountains of the north. In each of these areas a great variety of shrubs are found. The chaparral has great importance in preventing erosion and regulating stream flow and has a beauty that is not at first apparent. With such a wealth of shrubs a manual covering them fully is very desirable. Dr. McMinn says that the book is intended for non-professional botanists, teachers, students, foresters but may also serve the professional botanist. We venture to say that the botanist will find it almost an essential supplement to the manuals of flowering plants of the state. Both the amateur and professional will appreciate the line drawings showing details of leaf, stem, flower and fruit of each species described. These drawings are carefully done and of considerable beauty in addition to their accuracy. Also there are over forty full page half tones from photographs of the kind everyone who tries to photograph plants hopes to make and only occasionally succeeds in getting.

There are complete keys to genera and species and where varieties of a species are described there are keys for these. The introduction has a short section on the ecology of the shrubby plants of the state, and an illustrated explanation of terms. Following the main section of some 590 pages describing and illustrating the shrubs, there is a glossary, a list of specific and varietal names with their meanings, a list of nomenclature changes (58 new names or combinations of which 38 reduce species to varieties) and a section of 25 pages on the use of native shrubs in garden design.

*An Illustrated Manual of California Shrubs. Howard E. McMinn. XI + 689 pp. J. W. Stacey, Inc. 1939. $5.00.

This is essentially a book to be used, its beauty is incidental. Armed with this and the Illustrated Manual of Pacific Coast Trees by McMinn and Maino the botanist in the state or the interested visitor is fully prepared to learn the names, characters and distribution of all the woody plants of the state.

Wild Flowers for Nature Lovers*

G. T. Hastings

In the introduction the author tells of discovering in the sand dunes of Michigan an area of varied habitats where quantities of wild flowers blossom all summer. Here he has built a bungalow where he lives for seven months of the year. Here he has studied the flowers, their structure, adaptations for pollination and seed dispersal and methods of propagation. Much of what he has learned has gone into this book. While he describes the common and more attractive wild flowers found in the northern and eastern states, his love for the Michigan dunes shows in the starring of the names of all plants found there. As one looks through the volume and notes the great number of stars he does not wonder at Mr. Quick's enthusiastically naming the region an Eldorado of wild flowers.

The arrangement of the book is unusual. Beginning with the first week of April and continuing through to the fourth week of October the reader is taken into the woods or fields and the flowers to be found in blossom are described. At the end of each week's list several pages of dainty line drawings illustrate the plants described. In addition, eight colored plates add beauty to the book. Meant for those just beginning the study of plants, grasses, sedges and many of the small flowers that do not attract attention are omitted. For each plant given there is a brief non-technical description, the range and habitat, and notes on special features, pollination and methods of propagation. At the end of the book there is a short chapter on naturalizing wild flowers and a key based on color, the plants arranged in the order in which they come into bloom under each color.

* Wild Flowers of the Northern States and Canada, Arthur Craig Quick. 518 pages, 8 colored plates, 234 line drawings. M. A. Donohue and Co. 1939. $4.00.

In some cases the plants are not taken up in the order of flowering—thus the five species of sumac described are given in the chapter for the third week of August and in the same chapter among the ten milkweeds is the Four-leaved Milkweed, the blossoming time being noted as May-June. The Meadow Sweet (*Spiraea salicifolia*) is given in the second week of September. The common St. John's-wort in the third week and the Prickly Pear (*Opuntia Rafinesquii*) the last week in October.

The book is attractive and will bring pleasure to many flower lovers and should stimulate them not only in learning the names of flowers but also in learning what insects visit them and how they receive their visitors. Others, interested in making wild flower gardens, may find the notes on propagation of chief interest.

Root Nodule Bacteria*

G. T. H.

In 1932 Fred, Baldwin and McCoy published an extensive work on Root Nodule Bacteria and Leguminous Plants. Included was a bibliography as complete as the authors could make it. Now the authors have brought the bibliography up to date with a supplement listing nearly 50 titles inadvertently omitted in the original publication and about 500 articles published since 1932. In addition there are indices to the plants and authors mentioned in the original volume. Those who have the earlier publication will want this supplement, which will also be valuable to all those interested in the problems of nitrogen fixation and root nodule bacteria.

* Supplement to Root Nodule Bacteria and Leguminous Plants. Edwin Broun Fred, Ira Lawrence Baldwin and Elizabeth McCoy. 40 pages. University of Wisconsin Press. 1939. $.50.

Report of the Field Committee for the Year 1939

Of the 85 Torrey Botanical Club field meetings, 83 were held and two were cancelled by the leaders. Both of these were meetings where advance registration with the leader was required. In only one instance did no one show up to participate in a trip. In two instances the leader did not appear, but the trips were held. In four instances the leader arranged to turn the trip over to another.

Of the 83 trips held we have reports on 80. 1135 people participated, making an average of slightly over 14 per trip. The numbers run from one, the trip where no one came but the leader, to 92 at the Branchville Nature Conference. As in past years we held joint outings with other clubs. Besides the New York Microscopical, New York Mycological and Connecticut Botanical Societies, we went afield with the American Fern Society, Claytonia, Litchfield Garden Club, Muhlenberg Botanical Society, Newark Museum Nature Club, the Philadelphia Botanical Club, the Southern Appalachian Botanical Club, Summit Nature Club, Watching Nature Club, and the Western Pennsylvania Botanical Society. In addition we should acknowledge the indebtedness to institutions whose staff members assisted as leaders. These are the American Museum of Natural History, Bartlett Tree Research Laboratories, Boyce Thompson Institute for Plant Research, Brooklyn Botanic Garden, Brooklyn Institute, The College of the City of New York, Columbia University, including Teachers College, Fordham University, Montifiore Hospital, Newark Museum, Newark State Teachers College, New York Botanical Garden, Palisades Interstate Park, Rutgers University, New Jersey College for Women, School Nature League, Pennsylvania State College, Staten Island Institute of Arts and Sciences, Theodore Roosevelt High School, University of Pennsylvania, University of West Virginia, and Vassar College. A year ago I pointed out the high caliber of our faculty in the Outdoor University. The foregoing makes the point, since we find only a few in each institution with the requisite ability. We are pleased to include the Pennsylvania State Botanist, the present New Jersey State Geologist, and the former New Jersey State Geologist.

The Chairman wishes to express his appreciation of the work of those members of the Field Committee whose work made the schedule possible and who participated as leaders, particularly to

Dr. H. N. Moldenke, who not only led many trips but served as the Committee's New York representative, and received more complaints than the Chairman did. Finally, it is evident that the whole field program hinges upon the leaders, about seventy of them. The Chairman, the Committee, the entire Club is deeply indebted to them. Mr. Chairman, if it is in order, I move a vote of thanks to all those who helped in various ways to make the 1939 field meetings possible.

Those who led trips in 1939 were Mrs. Laura W. Abbott, Mr. R. D. Adolph, Dr. H. J. Arnold, Dr. J. M. Arthur, Mr. A. T. Beals, Dr. William J. Bonisteel, Mr. Illsley Boone, Dr. Stanley W. Bromley, Mr. William H. Carr, Dr. Harold H. Clum, Miss Nellie L. Condon, Dr. J. J. Copeland, Dr. Earl L. Core, Mr. John A. Crabtree, Mr. W. T. Davis, Mr. George F. Dillmann, Mr. Charles F. Doney, Mr. Charles Ericson, Dr. Clyde Fisher, Mr. Vernon L. Frazee, Miss Eleanor Friend, Dr. E. H. Fulling, Mr. Fred J. Ganser, Mr. R. Gordon Granger, Dr. A. H. Graves, Dr. A. J. Grout, Dr. Alfred Gundersen, Miss Elizabeth C. Hall, Mr. E. D. Hallock, Mr. Robert Hagelstein, Mr. E. B. Harger, Mr. George T. Hastings, Mr. Ernest Hoelle, Mrs. Alice Earle Hyde, Dr. Marion A. Johnson, Dr. Meredith Johnson, Dr. Jacob S. Joffe, Dr. J. P. Kelly, Mr. W. E. Kemble, Dr. Frank D. Kern, Mr. James Kezer, Dr. Henry B. Kümmel, Dr. Julia R. Lawrence, Dr. Michael Levine, Mr. F. R. Lewis, Mr. Harry Logan, Dr. Edwin B. Matzke, Mr. Oliver Medsger, Dr. Harold N. Moldenke, Mr. Joseph Monachino, Mr. G. G. Nearing, Dr. L. D. Overholtz, Mr. Frank Place, Miss Viola Richberg, Dr. Edith A. Roberts, Mr. J. L. Rodda, Mrs. J. L. Rodda, Dr. William E. Roever, Dr. John A. Small, Mr. Daniel Smiley, Jr., Mrs. Keith Smiley, Jr., Miss Ora Smith, Dr. H. K. Svenson, Mr. Peter Thein, Dr. W. S. Thomas, Dr. Alexander V. Tolstoouhov, Mr. Henry H. Tyron, Mr. J. Van Saun, Mrs. J. Van Saun, Miss Hilda Vilkomerson, Mr. Andrew Watts, Dr. William H. Wiegmann, Miss Farida A. Wiley, Mr. George B. Wilmott, Mr. G. L. Wittrock, and Dr. Edgar T. Wherry.

JOHN A. SMALL, *Chairman*

FIELD TRIPS OF THE CLUB

Trip of October 1, 1939 to Lake Mashipecong

Twelve members and friend of the club met at the new Life's Girls' camp at Lake Mashipecong. On the trail to Lost Lake two good stands of *Chelone glabra* were observed. The following asters and goldenrods were seen in bloom: *Aster divaricatus, A. ericoides, A. linariifolius, A. novae-angliae, A. paniculatus, A. undulatus, A. umbellatus* and *Solidago bicolor, S. caesia, S. graminifolia, S. odora, S. rugosa,* and *S. speciosa. Epigaea repens* was seen continually on the trail.

We approached Lost Lake, a quaking black spruce and tamarack bog, by way of an almost invisible trail through a thick growth of *Kalmia latifolia, Vaccinium corymbosum* and *Rhododendron viscosum. Sarracenia purpurea, Andromeda glaucophylla, Vaccinium oxycoccus, Kalmia angustifolia* and *Eriophorum virginicum* were the most prominent herbaceous plants in the bog. Dr. Chrysler and Dr. Small were rewarded for some careful searching of the black spruce by finding good specimens of *Arceuthobium pusillum,* the dwarf mistletoe. The lichen, *Alectoria* was found near the mistletoe.

A blazing fire in the fireplace of an old "Stagecoach Inn," now councillors' house, was a welcome sight on our return to the meeting place for luncheon. Rain had begun to fall and we were all somewhat chilled. Dr. Sharp, director of Life's Camps, who joined our morning trek served coffee which was much appreciated.

Five of us donned rain clothes after lunch and ventured down to Lake Mashipecong. The leader was most anxious to exhibit a handsome stand of *Ilex verticillata,* the branches full of bright red berry clusters. *Gentiana quinquifolia, G. crinita* and *Polygala sanguinea* were observed in flower.

Eleanor Friend

Trip of October 8 to the Estate of Mr. Louis E. McFadden in Peekskill

Seven of us met at Mr. McFadden's estate. This place is a veritable botanical garden. It comprises land formerly owned by the

late Rev. Henry Ward Beecher, and an adjoining piece formerly owned by the Beach family. Many exotic trees and shrubs were set out on both parts of the estate nearly sixty years ago and they have thrived there with a southern exposure. Parts of the property were neglected in recent years before Mr. McFadden obtained it, but those regions are all the more interesting to a botanist because seedlings of *Cladrastus lutea, Mahonia aquifolium, Aralia spinosa, Acer pseudoplatanus,* and varieties of *Acer palmatum* are springing up almost like weeds. Fortunately for the future of the place both Mr. McFadden and his superintendent, Mr. A. H. Brown, fully appreciate the botanical prize which they have, and they are endeavoring to have all the exotic plants accurately named. In this they have largely succeeded. They have been very generous with the leader, and on various occasions have given him and accompanying botanists free run of the place. This was the second TORREY trip which has been scheduled to the estate.

After parking the cars behind the barn and inspecting an English walnut tree, we went down the slope toward the front of the house. On the way we noted some Magnolias in fruit, and then specimens of *Taxodium distichum, Sophora japonica, Acer pictum,* and *A. campestre.* Directly in front of the house is a fine specimen of *Magnolia macrophylla.* At the edge of the lawn are three pines including *Pinus cembra.* A little farther to the west the planting is more dense, and at the edge of this is a tree of *Fagus sylvatica* var. *laciniata.* Farther down the slope among other trees stands *Pinus jeffreyi.* On the slope below the Beach house are two bushes of *Zenobia pulverulenta,* a real tree of *Oxydendron arboreum,* and representatives of *Pieris.* At the edge of the lawn in front of the Beach house are a number of odd plants including *Juniperus formosana,* some varieties of *Chamaecyparis obtusa,* a grotesque weeping form of fir, and others. Besides the drive leading to the Beach house is an unusually large, fine specimen of *Tsuga canadensis* var. *pendula.* Farther along are some fine specimens of *Taxus,* and behind these a couple of good-sized holly trees, and one of the queerest trees on the whole place, *Pinus bungeana,* a three-needle pine with scaling bark something like a sycamore.

After lunch we passed the gardens and greenhouse and along the way we stopped to look at a papaw tree, *Asimina triloba,* but no fruits were left on it. Nearer the greenhouse is a persimmon

tree, *Diospyros virginiana*. Mr. Brown thinks this may be the most northern specimen of persimmon. We followed a trail through a wilder portion of woodland at the back of the estate, but as we approached the Beach house again from the rear we found some other less-common plants: *Quercus phellos, Aesculus parviflora, Chionanthus virginica,* unusually attractive with its dark blue fruits; *Gymnocladus dioeca, Acer negundo,* and *Maclura pomifera.* This of course is but a partial list of the plants on the estate, and one must see them to fully appreciate the magnificence which some of them have attained in their fifty odd years of growth.

HAROLD H. CLUM

TRIP OF OCTOBER 20 TO 22 TO MOHONK LAKE

The 47 members and friends who gathered at the Lake Mohonk Mountain House found the Shawangunks to be at the height of their autumn coloring. Both hardwoods and softwoods contributed to the beautiful mosaic. We were told that the foliage had started to turn ten days later than normally, had colored up quite fast and was lasting longer than usual. The long continued summer drought and very late first frost were believed to be contributing factors.

On Saturday morning a large group set out for Millbrook Mountain, enjoying the thrill of a six mile "straw ride" behind horses. Near Sleepy Hollow a fine buck was seen bounding across the road. The ride along Undercliff road which is a narrow track carved out of a steep talus slope at the foot of a towering escarpment was awe inspiring. A three foot blacksnake was seen sunning himself on a rock.

The Millbrook Trail is comparatively easy and gives no warning of the magnificent panorama which greets one from the top. The distant haze merely served to emphasize the riot of color of nearby slopes and valleys. Box lunches were eaten at the very summit of the mountain while we watched an intermittent flight of hawks sail by, undoubtedly headed for Hawk Mountain which is on a continuation of this ridge. A stiff south wind gave them plenty of "up lift." Eleven Sharp-shins, 2 Turkey Vultures, and a Red-tail were identified, while two other Buteos and a Falcon were seen high overhead.

The afternoon route took us back through Coxing Clove to Lake Minnewaska, where we enjoyed a different view of the Cat-

skills and Shawangunks. To some the sight of Awosting Falls tumbling into the Hemlock and Rhododendron filled Peterskill ravine was the highlight of the trip.

For those who wished a less strenuous trip, Mrs. A. Keith Smiley, Jr., led an afternoon walk through the extensive Mohonk flower gardens. The chrysanthemums, gourds of many varieties, and late roses were especially noteworthy. The group continued on to Sky Top noting trees and berry-bearing shrubs in fall condition.

In the evening three reels of colored motion pictures showing Mohonk scenery and activities in fall and winter were projected.

On Sunday morning there were showers so we visited the Mohonk greenhouse to see the collection of cultivated and exotic species which are used for outside decoration in summer.

DANIEL SMILEY, JR.

TRIP OF OCTOBER 29 TO HAWK MOUNTAIN, PA.

The group of nine members and guests came from Connecticut, New York, New Jersey and Pennsylvania. We were made welcome to Hawk Mountain by Mr. Maurice Broun, Ornithologist-in-Charge. Splendid weather and good bird flights made the day an interesting one. The official count for the day listed 412 Red Tailed Hawks, 102 Sharp Shinned Hawks, 19 Red Shouldered Hawks, 7 Coopers Hawks, 1 Pigeon Hawk, 3 Vultures and 1 immature Golden Eagle. In addition one flock of 22 Canada Geese was seen and a huge flock of Red Winged Blackbirds containing hundreds of individuals.

One cannot cease to wonder at the large number of people who find it interesting to visit Hawk Mountain; there were several hundred visitors on this particular Sunday. The Hawk Mountain Sanctuary Association is doing a splendid piece of work in popularizing bird observation and in teaching the value of the Hawks.

J. L. RODDA
CLARA G. RODDA

TRIP OF OCTOBER 29 TO THE LOWER CROTON RIVER

Eight members of the Torrey Club and two visitors from the Connecticut Botanical Club met at the Harmon station and began to botanize along the road, where *Bidens bipinnata* and *Euphorbia*

preslii attracted particular attention. After walking along a few residential streets we came to the woods along the Croton River. Here we found good specimens of *Juglans* and *Platanus* and the usual woodland border plants, *Rhus, Robinia Rubus,* etc. On the ground Mr. Beals spotted *Ephemerum* for us. Going down the hill to the bottom of the valley we found some nice plants of *Asplenium platyneuron.* Farther up the river among the rocks were several Bryophytes, including *Anthoceros, Conocephalum, Climacium, Brachythecium* and *Entodon;* Pteridophytes including: *Selaginella, Thelypteris marginalis,* and *Polypodium vulgare;* and grasses: *Agrostis capillaris* and *Panicum capillare.* On the moist alluvial soil grew *Equisetum hyemale, Benzoin, Hamamelis,* maples, hemlock, *Carpinus* and *Liriodendron.* Two species of *Elymus,* and the bottle brush grass, *Hystrix patula,* were found along the way. The most unusual find of all was a flowering specimen of *Viola cucullata.*

HAROLD H. CLUM

TRIP OF JANUARY 14, 1940 TO THE BROOKLYN BOTANIC GARDEN

In spite of a stormy day, twenty-six members and guests of the Club took advantage of the invitation of the Brooklyn Botanic Garden to inspect the unique collection of cycads. Due to the efforts of the Administration all nine genera of this tropical order were represented, some genera by several species, the plants of *Macrozamia* from Australia being especially fine. The leader pointed out some of the peculiar features of the group, and exhibited cones of several genera.

The party then made a short survey of the other greenhouse collections, and adjourned to one of the laboratories where they were very kindly treated to afternoon tea by members of the Garden Staff. Being thus fortified, all members of the party, so we believe, survived the stormy journey home.

M. A. CHRYSLER, Leader

PROCEEDINGS OF THE CLUB

Meeting of October 18, 1939

The meeting of the Torrey Botanical Club held at the New York Botanical Garden on Wednesday, October 18, was called to order by the President, Dr. Arthur H. Graves, at 3.30 p.m.

Twenty-four members and friends were present.

The following were elected to annual membership: Mr. J. Horace Hatfield, Scotch Plains, N. J.; Mr. William E. Roever, Dept. of Bot., Rutgers Univ., New Brunswick, N. J., and Dr. Fred M. Schellhammer, 1610 Lurting Avenue, Bronx, New York.

Mr. Leonard W. Steiger, 835 Summit Ave., Hackensack, N. J., was elected to associate membership.

Dr. H. K. Svenson gave an interesting talk on Flowers of Middle Tennessee which was illustrated by colored slides. Dr. Svenson's abstract follows:

"Photographs in natural color were presented showing types of the flora of three sections of Tennessee: the cedar glades of Middle Tennessee, the Cumberland Plateau, the Great Smokies.

The cedar glades have a remarkable percentage of endemic plants which seem to be related to, and are sometimes identical with, plants of prairies west of the Mississippi River. Among the plants which were illustrated were *Psoralea subacaulis, Astragalus tennesseensis, Lobelia Gattingeri, Petalostemum Gattingeri, Leavenworthia sp.* The cedar glades, which are flat and dry limestone exposures east of Nashville, were formerly covered by extensive groves of red cedar. Nearly all of the sizable trees have been cut down for the manufacture of lead pencils during the last fifty years, so that only a scrub growth remains. These cedar glades occupy the central part of the Nashville Basin, which is bounded on all sides by an escarpment about five hundred feet high known as the Highland Rim, which forms the border of a fairly level plateau.

On the flat surface of this plateau [also known as the Highland Rim], chiefly in Coffee Co., occurs a great assemblage of plants usually found only on the Atlantic Coastal Plain. Among the plants illustrated from this area were *Sabatia campanulata, Lilium superbum, Habenaria cristata, H. ciliaris, H. integra, Phlox glaberrima.*

To the east of the Highland Rim rises the escarpment of the Cumberland Plateau, the base formed of limestone, the upper layers of resistant sandstones. In flat places on the sandstone are also coastal plain plants similar to those of the Highland Rim. The ravines of the Cumberland Plateau have a wealth of holly, *Magnolia macrophylla, Stewartia, Xanthorhiza,* and a number of interesting herbaceous plants such as *Boykinia* and *Saxifraga Grayana.*

The summits of the Great Smoky Mountains represented the third area (exploration in company with Dr. Jennison), pictures being shown of *Solidago glomerata*, *Impatiens*, and some of the large stands of timber.

CLYDE CHANDLER
Recording Secretary

MEETING OF NOVEMBER 6, 1939

The regular meeting of the Torrey Botanical Club held on November 6 at the American Museum of Natural History was called to order at 8.30 by the President.

Forty-seven persons were present.

The following were elected to annual membership in the Club:

Dr. Alphonse L. Heun, 3401 West Wisconsin Ave., Milwaukee, Wis.; Dr. B. W. Wells, Dept. of Bot., N. C. State College, Raleigh, N. C.; Dr. Ernst E. Naylor, N. Y. Bot. Gard., Bronx Park, New York; Dr. Paul A. Young, Tomato Disease Laboratory, Jacksonville, Texas; Dr. Virgene W. Kavanagh, N. Y. Bot. Gard., Bronx Park, New York; Mr. Frederick Kavanagh, N. Y. Bot. Gard., Bronx Park, New York; Prof. Arthur W. Haupt, Dept. of Bot., Univ. of Calif., Los Angeles, Calif., and Mr. Victor R. Larsen, 636 W. 174th St., New York.

The resignation of Mr. Jonathan Gordon, 361 Sterling Place, Brooklyn, New York, was accepted with regret.

It was voted by the Club to have the annual meeting held on January 9, 1940 instead of January 2 so that annual reports can be completed more easily after the close of the Club year on December 31.

The scientific program of the evening consisted of a lecture by Dr. B. O. Dodge on Mendelism in Fungi. The speaker's abstract follows:

"In genetic studies of higher plants and animals the effects of factors of inheritance are usually manifested in connection with diploid structures. In the fungi most of the morphological features are found in connection with haploid structures, so the effects of a single set of genes may be studied. The bakery molds of the genus *Neurospora* are excellent material for genetic studies. Lindegren was the first to point out that second division segregation with the development of four genotypically different kinds of spores in an ascus were measures of crossing-over percentages. Those who have worked genetically with smuts and mushrooms have assumed that disjunction of homologous chromosomes may occur either in the first or second division to account for the four types of spores developed at reduction of the zygote

nucleus. No doubt the discovery of linkage relations with crossing-over in these forms would go a long way to explain the principles underlying the segregation of the factors governing sex reactions in these forms.

Genetic studies by Burgeff with *Phycomyces* have proved that there is only one nuclear fusion at the formation of the zygospore, a point about which there has been much discussion among cytologists. The question of double fertilization and double reduction in the Ascomycetes can be settled very easily by finding that there may be eight genotypically different kinds of spores developed in an ascus, or that, where the spores are arranged serially in asci, the spores alternate one and one for some pair of factors.

The industrial yeasts that were long thought to develop asci parthenogenetically have been proved by Winge and his associates to reproduce sexually. They have already developed fourteen hybrid yeasts. The slime flux yeast has been shown by them to be excellent material for genetic studies. The segregation of three pairs of factors in the ascus is Mendelian. On the basis of morphological differentiation this yeast has male and female races according to the criteria of some of our mycologists. These size differences are no doubt merely morphological differences that are sex linked. With crossing-over and new combinations, the falsity of such an assumption will be made clear.

Other examples of Mendelian inheritance in the bakery molds, slime flux yeasts, smuts and mushrooms were illustrated. A more complete account of the address is being prepared for publication elsewhere."

Clyde Chandler
Recording Secretary

Meeting of November 15, 1939

The meeting of the Torrey Botanical Club held at Columbia University on November 15 was called to order by the President at 3.30 p.m.

Nineteen persons were present.

The minutes of the meeting on October 18 and November 6 were accepted as read.

It was moved by Dr. B. O. Dodge and seconded by Dr. J. S. Karling that the secretary cast a unanimous ballot for the election of Mrs. Kathleen Goddard Shirazi, 34 East 64th Street, New York, and Miss Gretchen D. Taylor, 127 Prospect Place, South Orange, N. J., to associate membership.

The resignation of Mr. Jerome Metzner, 1815 Morris Avenue, New York, was noted with regret.

The scientific program consisted of a talk on "Wound healing in higher plants" by Dr. R. Block of Columbia University. The author's abstract follows:

"The introductory part of this report dealt with the various cases of artificial and natural wounds in higher plants and with the description of contrasted types of wound healing and structural regeneration in organs and tissues of different structure and reactivity. The stages in the readaptation process of cells in wound tissues: dedifferentiation, cell growth and division and redifferentiation were described. The histological and metabolic changes during wound meristem activity and the effects of external and internal factors on cell division and differentiation, such as polarity, light, temperature, oxygen, water, pH, food distribution, enzymes and growth substances were discussed. The effects of necrotic and necrobiotic changes in the wound area on processes of cell division, and of normal or pathological dedifferentiation in adjacent cells were discussed in conjunction with the hormone hypothesis. A brief history of the concept of the wound hormone and its experimental isolation was given.

In many cases tissues comparable to wound tissues can be produced by an extreme change in external conditions, for example by high humidity (hyperhydric tissues, such as lenticel proliferations and intumescences), by darkening parts of the shoot, and by chemical stimulation (e.g. callus and adventitious root formation).

Wounding, therefore, may be regarded as one way of disturbing the normal physiological continuity of a plant and setting into motion a regulating reaction mechanism, of which, for example, structural regeneration is one visible expression. The question as to the exact interaction and nature of the factors concerned in this control must at present remain unanswered, but for the process of restoration of anatomical features at and near the surface of wounded organs a casual explanation seems available. Certain layers of cells below the wounded surface become meristematic, and this portion of the organ resumes development in so far as thickening of cell walls and condensation and oxidation processes near the surface produce histological and chemical characters similar to those developing during normal differentiation of the organ.

A brief discussion of the characteristics of plant-neoplasms, chemical and bacterial tumors, so-called spontaneous tumors of hybrids, and of insect galls concluded the lecture."

Clyde Chandler
Recording Secretary

Meeting of December 5, 1939

The meeting of the Torrey Botanical Club, held at the American Museum of Natural History on December 5 was called to order by the President at 8.15 p.m.

Fifty-seven members and friends were present.

The following were elected to annual membership: Dr. A. R. Bechtel, Wabash College, Crawfordsville, Ind.; Dr. J. F. Brenckle,

Mellette, S. Dak.; Dr. Ray J. Davis, University of Idaho, Southern Br., Pocatello, Idaho (transfer from associate); Dr. Henry P. Hansen, Department of Botany, Oregon State College, Corvallis, Ore.; Mr. Thomas Laskaris, N. Y. Botanical Garden, Bronx Park, New York; Dr. Gualterio Looser, Casilla 5542, Santiago, Chile; and Mr. William Lucian, Bishop St., Waterbury, Conn.

The following were elected to associate membership: Mrs. Werner Hartmann, 1 Bank Street, New York (transfer from annual membership); Miss Wilhelmine Meissner, 29-20 215th Place, Bayside, N. Y.; Prof. J. E. Weaver, University of Nebraska, Station A, Lincoln, Neb.; and Mrs. Merrill Willett (Leone N.), 210-21 29th Avenue, Bayside, N. Y.

The resignations of Sr. J. P. Carabia, c/o Hno. Leon, Colegio de la Salle, Vedado, Havana, Cuba; Miss Genevieve Clulo, West Virginia, Morgantown, W. Va.; Dr. Howard A. Kelly, 1406 Eutaw Place, Baltimore, Md.; Dr. Susan P. Nichols, 75 Elmwood Place, Oberlin, O.; Miss Irene Nelson, 524 East 236th Street, New York; and Miss Martha H. Hollinshead, 504 Camden Avenue, Moorestown, N. J., were noted with regret.

The deaths of Dr. William H. Brown, Johns Hopkins University, Baltimore, Md., and Mr. Arthur N. Leeds, 1025 Westview Ave., Germantown, Philadelphia, Pa., were reported to the Club.

The scientific monthly lecture was delivered by Dr. Michael Levine of the biological laboratories devoted to cancer research at the Montefiore Hospital, who presented a popular version of his studies on chemical tumors of plants. The following is an abstract of Dr. Levine's lecture.

"With the discovery of tar cancer in animals, attempts have been made to produce cancer by chemical means on plants.

Plants are known to harbor a form of cancer known as crown gall. This disease is produced on common economic plants by the introduction into wounds made by farm implements, of a bacterial soil organism known as *Phytomonas tumefaciens*. Crown gall is not analogous to human or animal cancer, but represents a new type of neoplasm such as plants only could produce when stimulated by the toxins produced by a parasite. Under experimental conditions these plant tumors possess the ability to invade the vital tissue of the plant and so destroy it. Under these conditions the plant cell multiplies for many cell generations. A large localized mass of "tumor" tissues is formed on the surface of the plant. The cell multiplication, however, is due to the presence of the bacteria. Cell proliferation is nevertheless limited. The tumor grows old and dies. Most frequently, however, it may be pointed out that these growths are harmless and play no rôle in the plant economy.

The carcinogenic hydrocarbons which produce cancer in animals are poisonous to plants and fail to produce cancer. Certain irritating substances like indole acetic acid, indole butyric acid, naphthalene acetic acid and a series of scarlet red dyes, when applied to the injured surface of a plant produce roots together with small tumors. These chemical tumors have been intensively studied. On certain plants these irritating substances produce tumors which, but for size, are identical, microscopically, with those produced by the bacteria, *Phytomonas tumefaciens*. The cells seem to be stimulated to proliferate or multiply as long as the bacteria function. The chemical agents applied to an injured stem seem to induce the cells in this area to multiply. These stimulating effects are soon worn off. Repeated treatments under present experimental conditions, result only in limited growths. The applications of vitamin B1 and growth substances do not affect the multiplication of the first stimulated cell. Like crown gall tissue, these small growths become old, turn into wood or cork, and die.

The speaker believes that the plant tumor is a part of a reparative and protective mechanism of the plant. These plant responses are analogous to inflammation in the animal. It is hoped that plants ultimately will be made to form tumors as a response to chemical substances, where the plant cells will be so modified as to proliferate without limit, endowing them with a property now possessed by animal cancer. The production of malignant plant growths will throw light on the mechanism of cancer production in animals. The absence of blood and lymph streams, and lack of diversity of tissue types make the plant a suitable subject for the study of this important problem."

Clyde Chandler
Recording Secretary

Meeting of December 20, 1939

The meeting of the Torrey Botanical Club held on December 20, 1939 at The New York Botanical Garden was called to order by the President at 3.30 p.m.

Thirty-one persons were present.

The minutes of November 15 and December 5 were adopted as read.

It was moved by Dr. Dodge and seconded by Dr. Karling that the secretary be instructed to cast a unanimous ballot for the election of the following members:

Annual: Mrs. William L. Skelton, 524 High Street, Bath, Me.; Dr. Fred T. Wolf, Biology Dept., Vanderbilt University, Nashville, Tenn.; Miss Ruth Ann Bobrov, 1879 Prospect Ave., New York; Prof. F. M. Pagan, Dept. of Bot., University of Michigan, Ann Arbor, Mich.; and Miss Agnes Beschnitt, 10765 117th St., Richmond Hill, N. Y.

Associate: Miss Louise M. Edelson, 1488 East 17th St., Brooklyn, New York.

The following resignations from annual membership were noted with regret:

Mrs. Spencer Scott Marsh, Midwood Terrace, Madison, N. J.; Dr. Takewo Hemmi, College of Agriculture, Phytopathological Institute, Kyoto Imperial University, Kyoto, Japan; and Prof. Fanchon Hart, College of Pharmacy, Columbia University, New York.

It was suggested by Dr. Karling that the Treasurer obtain resolutions from the Savings Banks so that they may be presented at the Council meeting of January 9 so that a special meeting of the Council need not be called for a hearing of said resolutions.

The scientific lecture on "The Response of the Chicle Tree to Bleeding in British Honduras" was presented by Dr. J. S. Karling. The speaker's abstract follows:

"*Achras zapota* when tapped by the ibiden method employed on *Hevea braziliensis* shows no response in the form of greater latex yield. The first incision drains all of the latex for a distance of approximately 16 inches above and below. Trees tapped daily by the ibidem method over a period of twelve weeks yielded no latex after the first day."

Clyde Chandler
Recording Secretary

NEWS NOTES

At the Columbus meeting of the American Association for the Advancement of Science Dr. Albert F. Blakeslee, director of the department of genetics of the Carnegie Institution of Washington at Cold Spring Harbor, Long Island, was elected president for 1940. As Dr. Blakeslee has long been an active member of our club and served as president in 1933, we feel that we share in the honor shown him.

At the same meeting Dr. M. L. Fernald, of Harvard, was elected vice-president and chairman of the Botanical Section and Dr. W. J. Robbins, of the New York Botanical Garden, a member of the Sectional Committee for Botanical Sciences. Dr. E. N. Transeau, of Ohio State University was elected president of the

Botanical Society of America, Dr. Neil E. Stevens, of the University of Illinois, vice-president, Dr. Paul R. Burkholder, Buffalo Museum of Science, secretary, and Dr. Paul Weatherwax, Indiana University, treasurer.

Dr. Edmund Ware Sinnott, professor of botany at Barnard College has been appointed Sterling professor of botany, chairman of the department, and director of the Marsh Botanical Gardens at Yale University, the appointment becoming effective on July 1. Dr. Sinnott served as president of the Torrey Club from 1930 through 1932.

Dr. Elmer D. Merrill, Harvard University, has been elected president of the Board of Directors of the Fairchild Tropical Garden at Cocoanut Grove, Florida. Dr. Merrill was one of the speakers at the dedication of the garden in March, two years ago.

Dr. J. C. Arthur, professor emeritus of botany at Purdue University, observed his ninetieth birthday on January 11.

Dr. Harry Milliken Jennison, since 1923 professor of botany at the University of Tennessee, died on January 5 in his fifty-fifth year. Dr. Jennison, whose special interest was in the taxonomy of the higher plant was a member of our club.

On September 18 the University of Minnesota Hudson Bay Expedition returned. The party explored and collected in the Richmond Gulf area and around the Great Whale River as well as on Belcher Islands in the Bay. The collections numbered about 8,000 specimens of which 1,336 numbers were flowering plants and 400 were of the lower plants. In addition tree borings were made to get material for a study of correlation of tree growth and climatic conditions. The party was in charge of Dr. Ernst C. Abbe.

Mr. Oakes Ames, of Harvard University, has presented to the University his orchid herbarium of 57,000 specimens, his library of over 1,800 volumes and pamphlets about orchids, and the sum of $68,000 to establish an endowed curatorship for the collection.

One of our members, Mr. George F. Dillman, reports a successful summer last year in his outdoor course of nature study for boys. This summer he will have a base camp located on an old farm at Otis, Mass., in one of the wildest parts of the Berkshires, from

which trips for nature study will be made in various directions. For particulars address Mr. Dillman at Edgewood School, Greenich, Conn.

A new international address book of workers in plant taxonomy, geography and ecology is being prepared by the editor of *Chronica Botanica,* Dr. Verdoon, of Leiden, Holland. Those who would like their names in this book are asked to send to Dr. E. D. Merrill, Arnold Arboretum, Jamaica Plain, Mass., for a card to be filled out with the requisite data.

The Organizing Committee of the Seventh Botanical Congress which was to have been held in Stockholm in 1940 has, because of the present international condition, decided to postpone all preparations for the Congress until further notice.

The Eighth American Scientific Congress will be held in Washington, D. C. from May 10 to 18, 1940. Governments of the American Republics and scientific institutions and organizations have been invited to send representatives. The Congress will be divided into eleven sections, Anthropology, Biology, Geology, Agriculture and Conservation, Public Health, Physics and Chemistry, Statistics, Geography and History, International Law, Economics and Education.

The summer meeting of the American Association of Science will be held at the University of Washington in Seattle from June 17 to 22. The Pacific Section of the Botanical Society of America will meet at the same time and place. Any member of the Botanical Society of America who wishes to present a paper at this meeting should send the title of the paper and an abstract of not over two hundred words to Dr. Ira L. Wiggins, Stanford University, Calif., not later than the first of May.

WANTED—Due to unexpected requests for the January-February number of TORREYA (Volume 40, number 1), the treasurer has no extra copies to fill orders. Any members who have copies they do not care to keep will do the Club a favor by sending the copies to either the treasurer, Dr. Harold N. Moldenke, New York Botanical Garden, or to the editor. If desired the Club will pay the regular price of thirty cents each for the copies.

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THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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Cryptogams

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A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

Vol. 40 May-June, 1940 No. 3

Plants of Fishers Island

Charles C. Hanmer

The following list of Plants of Fishers Island, New York, is the result of about thirty years' collecting on the Island.

The last seven years plants have been collected for the Herbarium of the Brooklyn Botanic Garden. Almost all of this collection is now deposited in the above Herbarium.

The list contains about five hundred species and I feel that it is fairly complete, although I am sure that more species will be added from time to time.

Since 1926 a number of species have become very rare, or have disappeared entirely from the Island's flora. This refers largely to swamp plants, which could not survive the severe draining, with the resultant growth of briars and small trees.

Much credit is due my friend, Mr. Charles A. Weatherby, Senior Curator of the Gray Herbarium, Cambridge, Massachusetts, for his careful determination of the species unknown to me.

I wish to express my appreciation of the kindly interest and many courtesies accorded me, both from individuals and the Island's officials. Without these courtesies the project could not have reached its present degree of completeness.

The nomenclature used is that of the Seventh Edition of Gray's Manual, except for a few more recent names.

Plants Found Growing on Fishers Island From 1905 to 1935

Spinulose Shield Fern	*Aspidium spinulosum* (O. F. Müller) Sw.
Marsh Shield Fern	*Aspidium Thelypteris* (L.) Sw. Common.
Hay-scented Fern	*Dicksonia punctilobula* (Michx.) Gray. Common locally.
Sensitive Fern	*Onoclea sensibilis* L. Common locally.
Christmas Fern	*Polystichum acrostichoides* (Michx.) Schott. Rare, one station known for 45 years, another found in 1935.

Net-veined Chain Fern	*Woodwardia areolata* (L.) Moore. Fairly common in swamps.
Virginia Chain Fern	*Woodwardia virginica* (L.) Sm. Fairly common in swamps.
Cinnamon Fern	*Osmunda cinnamomea* L. Common.
Field Horsetail	*Equisetum arvense* L. Occasional.
Bog Club Moss	*Lycopodium inundatum* L. var. *Bigelovii* Tuckerman. Rare. One station known.
Red Cedar or Savin	*Juniperus virginiana* L. Occasional.
Pitch Pine	*Pinus rigida* Mill. A few old trees.
White Cedar	*Thuja occidentalis* L. Several trees in swamp edge.
Narrow-leaved Cat-tail	*Typha angustifolia* L. Common in open swamps.
Broad-leaved Cat-tail	*Typha latifolia* L. Not as common as the Narrow-leaved.
Pondweed	*Potamogeton bupleuroides* Fernald. Common in lakes.
Pondweed	*Potamogeton pusillus* var. *tenuissimus* M.&K. In lakes. More species presumably occur.
Seaside Arrow-Grass	*Triglochin maritima* L. Common in salt marshes.
Broad-leaved Arrow Head	*Sagittaria latifolia* Willd. Fine colony in drained swamp, 1934.
Couch-grass	*Agropyron repens* (L.) Beauv. Common.
Herd's Grass	*Agrostis alba* L. Common.
Beach Grass	*Ammophila arenaria* (L.) Link. Common.
Forked Beard-grass	*Andropogon furcatus* Muhl.
Broom Beard-grass	*Andropogon scoparius* Michx. Common.
Soft Chess	*Bromus hordeaceus* L. Occasional.
Blue-joint Grass	*Calamagrostis canadensis* (Michx.) Beauv.
Bur-grass	*Cenchrus carolinianus* Walt. Occasional.
Large Crab-grass	*Digitaria sanguinalis* (L.) Scop. Too common. Pest.
Marsh Spike-grass	*Distichlis spicata* (L.) Greene. Common.
Barnyard Grass	*Echinochloa crusgalli* (L.) Beauv. Common.
Barnyard Grass	*Echinochloa muricata* (Michx.) Fernald.
Salt-marsh Cockspur Grass	*Echinochloa Walteri* (Pursh) Nash. Common in marshes.
Virginia Wild Rye	*Elymus virginicus* L.
——— ———	*Eragrostis caroliniana* (Spreng.) Scribn.
Stink or Snake Grass	*Eragrostis megastachya* (Koeler) Link. Occasional.
Sheep Fescue-grass	*Festuca ovina* L.
Blunt Manna-grass	*Glyceria obtusa* (Muhl.) Trin. Rather common.
Holy Grass	*Hierochloe odorata* (L.) Wahlenb.

Velvet Grass	*Holcus lanatus* L. Fairly common.
Squirrel-tail Grass	*Hordeum jubatum* L. Occasional.
Leptochloa	*Leptochloa fascicularis* (Lam.) Gray.
Ray-grass	*Lolium perenne* L. Common.
Witch Grass	*Panicum capillare* L. Common.
Hispid Panicum	*Panicum clandestinum* L. Occasional.
Panicum	*Panicum dichotomiflorum* Michx.
Panicum	*Panicum meridionale* Ashe.
Panicum	*Panicum oricola* Hitchc. & Chase. Common.
Scribner's Panicum	*Panicum Scribnerianum* Nash. Fairly common.
Tall Smooth Panicum	*Panicum virgatum* var. *obtusum* Wood.
Muhlenberg's Paspalum	*Paspalum Muhlenbergii* Nash.
Herd's Grass, Timothy	*Phleum pratense* L. Common.
Reed	*Phragmites communis* Trin. Common. Fort Meadow.
Wire-grass	*Poa compressa* L. Common.
Yellow Foxtail; Pigeon Grass	*Setaria glauca* (L.) Beauv.
Indian Grass	*Sorghastrum nutans* (L.) Nash.
Salt Reed Grass	*Spartina cynosuroides* (L.) Roth.
Salt Marsh Grass	*Spartina glabra* var. *alterniflora* (Loisel.) Merr.
Salt Marsh Grass	*Spartina glabra* var. *pilosa* Merr.
Slough Grass	*Spartina Michauxiana* Hitchc.
Above 4 species more or less common.	
Salt Meadow Grass	*Spartina patens* (Ait.) Muhl. Common.
Salt Meadow Grass	*Spartina patens* var. *juncea* (Michx.) Hitchc. Common.
Sand Grass	*Triplasis purpurea* (Walt.) Chapm.
Greenish-white Sedge	*Carex albolutescens* Schwein. Lake strand.
Fringed Sedge	*Carex crinita* Lam.
Fringed Sedge	*Carex crinita* var. *gynandra* (Schw.). S.&T.
Fringed Sedge	*Carex crinita* var. *minor* Boott.
Sallow Sedge	*Carex lurida* Wahlenb. Fairly common.
Muhlenberg's Sedge	*Carex Muhlenbergii* Schkuhr.
Sedge	*Carex rostrata* var. *utriculata* (Boott) Bail.
Sea-beach Sedge	*Carex silicea* Olney. Common.
Downy-green Sedge	*Carex virescens* Muhl.
Downy-green Sedge	*Carex virescens* var. *Swanii* Fernald.
Twig Rush	*Cladium mariscoides* (Muhl.) Torr.
Toothed Cyperus	*Cyperus dentatus* Torr. Common.
Low Cyperus	*Cyperus diandrus* Torr. Common.
Yellow Nut-grass	*Cyperus esculentus* L. Common.
Slender Cyperus	*Cyperus filiculmis* Vahl. Common.
Gray's Cyperus	*Cyperus Grayi* Torr.
Nuttall's Cyperus	*Cyperus Nuttallii* Eddy.
Straw-colored Cyperus	*Cyperus strigosus* L.

Dulichium	*Dulichium arundinaceum* (L.) Britton. Common in some localities.
Spike-rush	*Eleocharis obtusa* (Willd.) Schultes. Common.
Virginia Cotton-grass	*Eriophorum virginicum* L. Occurs in one swamp.
Slender Fimbristylis	*Fimbristylis autumnalis* (L.) R.&S.
Frank's Fimbristylis	*Fimbristylis Frankii* Steud.
Squarrose Fuirena	*Fuirena squarrosa* Michx. Found only once.
White Beaked-rush	*Rynchospora alba* (L.) Vahl. Fairly common in one swamp.
Clustered Beaked-rush	*Rynchospora glomerata* (L.) Vahl. Fairly common in one swamp.
Chairmakers Rush	*Scirpus americanus* Pers. Fairly common.
Wool-grass	*Scirpus cyperinus* (L.) Kunth. Fairly common.
Salt Marsh Bulrush	*Scirpus robustus* Pursh. Fairly common.
Great Bulrush	*Scirpus validus* Vahl. Fairly common.
Carolina Yellow-eyed Grass	*Xyris caroliniana* Walt. Strand, Barlow's Pond.
Asiatic Day-flower	*Commelina communis* L. Very common.
Sharp-fruited Rush	*Juncus acuminatus* Michx. Common.
Toad Rush	*Juncus bufonius* L. Common.
Canada Rush	*Juncus canadensis* J. Gay. Common.
Forked Rush	*Juncus dichotomus* Ell. Common.
Common Rush; Bog Rush	*Juncus effusus* L. Common.
Common Rush var.	*Juncus effusus* var. *compactus* L.&C.
Common Rush var.	*Juncus effusus* var. *costulatus* Fernald.
Gerard's Rush	*Juncus Gerardi* Loisel. Common.
Green's Rush	*Juncus Greenei* Oakes & Tuck. Common.
Brownish-fruited Rush	*Juncus pelocarpus* Mey.
Common Wood-rush	*Luzula campestris* var. *multiflora* (Ehrh.) Celak. Common.
Meadow Garlic	*Allium canadense* L. Common. Fort Meadows.
Asparagus	*Asparagus officinalis* L. Occurs around salt-water shores.
Red Lily; Wood Lily	*Lilium philadelphicum* L. Common in open, Fort Meadows.
Turk's-cap Lily	*Lilium superbum* L. Common in some swamps, but is being crowded out.
False Lily-of-the-valley	*Maianthemum canadense* Desf. Very common.
Indian Cucumber-root	*Medeola virginiana* L. Common in several localities.
Sessile-leaved Bellwort	*Oakesia sessilifolia* (L.) Wats. Not common. One or two stations.

Wild Spikenard	*Smilacina racemosa* (L.) Desf. Not common.
Star-flowered Solomon's Seal	*Smilacina stellata* (L.) Desf. Not common. Two or three stations.
Glaucous-leaved Greenbrier	*Smilax glauca* Walt. Common.
Carrion-flower	*Smilax herbacea* L. Common.
Greenbrier; Catbrier	*Smilax rotundifolia* L. Common.
Star-grass	*Hypoxis hirsuta* (L.) Coville. Common.
Slender Blue Flag	*Iris prismatica* Pursh. Occasional.
Larger Blue Flag	*Iris versicolor* L. Common.
Eastern Blue-eyed Grass	*Sisyrinchium atlanticum* Bicknell. Common.
Arethusa	*Arethusa bulbosa* L. Found once several years ago.
Calopogon; Grass Pink	*Calopogon pulchellus* (Sw.) R. Br. Was very common before draining of swamp.
Small Green Wood Orchid	*Habenaria clavellata* (Michx.) Spreng. Formerly common.
Ragged Orchid	*Habenaria lacera* (Michx.) R. Br. Formerly common.
Rose Pogonia	*Pogonia ophioglossoides* (L.) Ker. Was very common before draining of swamp.
Beck's Ladies' Tresses	*Spiranthes Beckii* Lindl.
Nodding Ladies' Tresses	*Spiranthes cernua* (L.) Richard. Fairly common.
Grass-leaved Ladies' Tresses	*Spiranthes praecox* (Walt.) W. & C.
Balsam Poplar	*Populus balsamifera* L. One station. Peninsular.
Bayberry; Waxberry	*Myrica carolinensis* Mill. Very common.
Smooth Alder	*Alnus rugosa* (Du Roi) Spreng. Fairly common.
Cherry, Black or Sweet Birch	*Betula lenta* L. Several stations.
Yellow Birch, Gray Birch	*Betula lutea* Michx. f. var. *macrolepis* Fernald.
American Beech	*Fagus grandifolia* Ehrh. Several stations.
False Nettle	*Boehmeria cylindrica* (L.) Sw. Occasional.
American Elm	*Ulmus americana* L. A few trees.
English Elm	*Ulmus campestris* L. A few local trees.
Buckwheat	*Fagopyrum esculentum* Moench. Occasional.
Coast Jointweed	*Polygonella articulata* (L.) Meisn. Common in very sandy soil.
Dotted or Water Smart-weed	*Polygonum acre* H B K. Common.
Halberd-leaved Tearthumb	*Polygonum arifolium* L. Occasional.
Knot-grass; Door Weed	*Polygonum aviculare* L. Common.
Knot-grass; Door Weed	*Polygonum aviculare* var. *littorale* (Link) Koch. Common.
Copse or Hedge Buckwheat	*Polygonum dumetorum* L. Common.
Pennsylvania Persicaria	*Polygonum pennsylvanicum* L. Common.
Climbing False Buckwheat	*Polygonum scandens* L. Common.

Field or Sheep Sorrel	*Rumex Acetosella* L. Common.
Curled Dock	*Rumex crispus* L. Common.
Broad-leaved or Bitter Dock	*Rumex obtusifolius* L. Apparently not common.
Halberd-leaved Orache	*Atriplex patula* var. *hastata* (L.) Gray. Common.
Lamb's Quarters	*Chenopodium album* L. Common.
Lamb's Quarters	*Chenopodium album* var. *viride* (L.) Moq. Common.
Mexican Tea	*Chenopodium ambrosioides* L. Common.
Red Goosefoot	*Chenopodium rubrum* L. Common on sea beaches.
Woody Glasswort	*Salicornia ambigua* Michx. Common in salt marshes.
Slender Glasswort	*Salefornia enropaea* L. Common, marshes.
Bigelow's Glasswort	*Salicornia mucronata* Bigel. Not as common as above two species.
Saltwort	*Salsola Kali* L. Occasional on sea beaches.
Tall Sea-blite	*Suaeda linearis* (Ell.) Moq. Fairly common on sea beaches.
Tumble Weed	*Amaranthus graecizans* L. Occasional.
Rough Pigweed	*Amaranthus retroflexus* L. Common.
Poke	*Phytolacca decandra* L. Common.
Knawel; German Knotgrass	*Scleranthus annuus* L. Common.
Carpet-weed	*Mollugo verticillata* L. Common in cultivated soil.
Blunt-leaved Sandwort	*Arenaria lateriflora* L. Occasional.
Sea-beach Sandwort	*Arenaria peploides* L. Occasional on sea beaches.
Field Chickweed	*Cerastium arvense* L. Occasional on lawns.
Larger Mouse-eared Chickweed	*Cerastium vulgatum* L. Common.
Deptford Pink	*Dianthus Armeria* L. Common.
White Campion; Evening Lychnis	*Lychnis alba* Mill. Common.
Bouncing Bet	*Saponaria officinalis* L. Common.
Bladder Campion	*Silene latifolia* (Mill.) Britten & Rendle. Occasional.
Spurrey; Corn Spurrey	*Spergula arvensis* L. Occasional.
Sand Spurrey	*Spergularia leiosperma* (Kindb.) Fern. & Wieg. Common around brackish ponds.
Sand Spurrey	*Spergularia marina* (L.) Griseb. Fairly common.
Lesser Stitchwort	*Stellaria graminea* L. Occasional.
Common Stitchwort	*Stellaria media* (L.) Cyrill. Common.
Purslane; Pussley	*Portulaca oleracea* L. Common.
Large Yellow Pond Lily	*Nymphaea advena* Ait. Common, at least in Barlow Pond.

Tall Anemone	*Anemone virginiana* L. Occasional.
Clematis (cult.)	*Clematis paniculata* Thunb. Escaped freely.
Virginia Virgin's Bower	*Clematis virginiana* L. Common.
Tall or Meadow Buttercup	*Ranunculus acris* L. Common.
Bulbous Buttercup	*Ranunculus bulbosus* L. Most common of the family.
Seaside Crowfoot	*Ranunculus Cymbalaria* Pursh. Rare. One station known.
Tall Meadow-Rue	*Thalictrum polygamum* Muhl. Common in meadows.
Meadow-Rue	*Thalictrum revolutum* DC. Occasional with above.
European Barberry	*Berberis vulgaris* L. Occasional.
Sassafras or Ague Tree	*Sassafras variifolium* (Salisb.) Ktze. Occasional. Common on South Dumpling Island.
Yellow Rocket or Cress	*Barbarea vulgaris* R. Br. Fairly common.
White Mustard	*Brassica alba* (L.) Boiss. Not as common as Black Mustard.
Black Mustard	*Brassica nigra* (L.) Koch. Fairly common.
American Sea Rocket	*Cakile edentula* (Bigel.) Hook. Common on sea beaches.
Shepherd's Purse	*Capsella Bursa-pastoris* (L.) Medic. Common.
Wormseed or Treacle Mustard	*Erysimum cheiranthoides* L. Occasional, cultivated soil.
Apetalous Pepper-grass	*Lepidium apetalum* Willd. Common.
Field or Cow Cress	*Lepidium campestre* (L.) R. Br. Occasional.
Garden Cress	*Lepidium sativum* L. Occasional.
Wild Peppergrass	*Lepidium virginicum* L. Common.
Hispid Yellow-cress	*Radicula palustris* (L.) Moench. Occasional.
Wild Radish	*Raphanus Raphanistrum* L. Not recently found.
Tumble Mustard	*Sisymbrium altissimum* L. Not recently found.
Hedge Mustard	*Sisymbrium officinale* var. *leiocarpum* DC. Common.
Oblong-leaved Sundew	*Drosera longifolia* L. Fairly common around pond strands.
Small-flowered Agrimony	*Agrimonia parviflora* Ait. Occasional. Not found recently.
Shad Bush; June-berry	*Amelanchier canadensis* (L.) Medic. Common.
Shad Bush	*Amelanchier oblongifolia* (T.&G.) Roem. Not as common as type.
Virginia Strawberry	*Fragaria virginiana* Duchesne. Common.
Avens	*Geum canadense* Jacq. Not found recently.

Silver-weed	*Potentilla Anserina* L. Common on sea beaches.
Rough Cinquefoil	*Potentilla monspeliensis* L. Occasional.
Rough Cinquefoil var.	*Potentilla monspeliensis* var. *norvegica* (L.) Rydb. Occasional.
Rough-fruited Cinquefoil	*Potentilla recta* L. Fairly well established.
Beach Plum	*Prunus maritima* Wang. Common, both purple and yellow fruits.
Wild Black Cherry	*Prunus serotina* Ehrh. Probably the commonest tree.
Choke Cherry	*Prunus virginiana* L. Not as common as above.
Red Choke-berry	*Pyrus arbutifolia* (L.) L.f. Very common with following. Red fruit.
Choke-berry	*Pyrus arbutifolia* var. *atropurpurea* (Britton) Robinson. Fruit black.
Black Choke-berry	*Pyrus melanocarpa* (Michx.) Willd. Occasional.
Swamp Rose	*Rosa carolina* L. Probably the commonest rose.
Sweetbrier	*Rosa rubiginosa* L. Occasional.
Rosa Rugosa	*Rosa rugosa* Thunb. A well-established escape.
Virginia Rose	*Rosa virginiana* Mill. Common.
Hispid or Running Swamp Blackberry	*Rubus hispidus* L. Common.
Hardhack; Steeple-bush	*Spiraea tomentosa* L. Occasional.
False Indigo	*Amorpha fruticosa* L. An escape.
Ground-nut	*Apios tuberosa* Moench. Fairly common.
Wild Indigo	*Baptisia tinctoria* (L.) R. Br. Rare. Found twice.
Beach Pea	*Lathyrus maritimus* (L.) Bigel. Very common along shore.
Tuberous Pea	*Lathyrus tuberosus* L. One station known to me.
Round-headed Bush Clover	*Lespedeza capitata* Michx. Common.
Bush Clover	*Lespedeza frutescens* (L.) Britton. Not found recently.
Black or Hop Medic	*Medicago lupulina* L. Not common.
Alfalfa; Lucerne	*Medicago sativa* L. Common in meadows.
White Sweet-clover	*Melilotus alba* Desr. Common.
Yellow Sweet-clover	*Melilotus officinalis* (L.) Lam. Not as common as above.
Locust Tree	*Robinia Pseudo-Acacia* L. A common tree.
Clammy Locust	*Robinia viscosa* Vent. One introduced colony. Pest.

Trailing Wild Bean	*Strophostyles helvola* (L.) Britton. Common around shore.
Yellow or Hop Clover	*Trifolium agrarium* L. Common.
Rabbit's foot Clover	*Trifolium arvense* L. Common.
Red, Purple or Meadow Clover	*Trifolium pratense* L. Common.
White, Dutch or Honeysuckle Clover	*Trifolium repens* L. Common.
Smaller Common Vetch	*Vicia Angustifolia* (L.) Reichard. Occasional.
Smaller Common Vetch	*Vicia angustifolia* var. *segetalis* (Thuill.) Koch. Occasional.
Tufted or Cow Vetch	*Vicia Cracca* L. Common.
Flax; Linseed	*Linum usitatissimum* L. Apparently not common.
Wild Yellow Flax	*Linum virginianum* L. Occasional.
Oxalis	*Oxalis europaea* Jord. Common.
Hemlock Stork's-bill	*Erodium cicutarium* (L.) L'Her. Found once in lawn.
Carolina Crane's-bill	*Geranium carolinianum* L. Common.
Three-leaved Hop-Tree	*Ptelea trifoliata* L. Several colonies.
Ailanthus; Tree-of-Heaven	*Ailanthus glandulosa* Desf. One large colony and some scattered trees.
Marsh Milkwort	*Polygala cruciata* L. Occasional in salt marshes.
Racemed Milkwort	*Polygala polygama* Walt. Fairly common.
Purple Milkwort	*Polygala sanguinea* L. Fairly common.
Whorled Milkwort	*Polygala verticillata* L. Fairly common.
Slender Three-seeded Mercury	*Acalypha gracilens* Gray. Occasional.
Three-seeded Mercury	*Acalypha virginica* L. Occasional, cultivated soil.
Cypress Spurge	*Euphorbia Cyparissias* L. One small colony.
Spotted Spurge	*Euphorbia maculata* L. Common.
Seaside Spurge	*Euphorbia polygonifolia* L. Common on sea beaches.
Large Spotted Spurge	*Euphorbia Preslii* Guss. Occasional.
Dwarf or Black Sumac	*Rhus copallina* L. Common.
Smooth or Scarlet Sumac	*Rhus glabra* L. Commoner than above species.
Poison or Three-leaved Ivy	*Rhus Toxicodendron* L. Too abundant.
Staghorn Sumac	*Rhus typhina* L. Common.
Poison Sumac; Poison Elder	*Rhus Vernix* L. Occasional.
Virginia Winter-berry; Black Alder	*Ilex verticillata* (L.) Gray. Occasional.
Climbing Bittersweet	*Celastrus scandens* L. Fairly common.
Sycamore Maple	*Acer Pseudo-Platanus* L. A sturdy well established tree probably originally planted.

Swamp Maple	*Acer rubrum* L. Common in swamp localities.
Spotted Touch-me-not	*Impatiens biflora* Walt. Common.
Woodbine; Virginia Creeper	*Psedera quinquefolia* (L.) Greene. Common.
American Linden; Bass-wood	*Tilia americana* L. At least one large native tree in East End swamp.
European Linden	*Tilia vulgaris* Hayne. Several planted specimens.
Swamp Rose-Mallow	*Hibiscus Moscheutos* L. Fairly common in several swamps.
Musk Mallow	*Malva moschata* L. Apparently not common recently.
Low Mallow; Cheeses	*Malva rotundifolia* L. Common.
Northern St. John's-wort	*Hypericum boreale* (Britton) Bickn.
Canadian St. John's-wort	*Hypericum canadense* L. Common around lake shores.
Orange Grass; Pine-weed	*Hypericum gentianoides* (L.) BSP. Common.
Dwarf St. John's-wort	*Hypericum mutilum* L. Common.
Common St. John's-wort	*Hypericum perforatum* L. Probably the commonest species.
St. John's-wort	*Hypericum punctatum* Lam.
Marsh St. John's-wort	*Hypericum virginicum* L. Fairly common.
Long Branched Frostweed	*Helianthemum canadense* (L.) Michx. Fairly common.
Hoary Frostweed	*Helianthemum majus* BSP. Fairly common.
False Heather; Poverty Grass	*Hudsonia tomentosa* Nutt. Very common on sand dunes.
Beach Pin-weed	*Lechea maritima* Leggett. Fairly common.
Thyme-leaved Pin-weed	*Lechea minor* L. Fairly common.
Early Blue Violet	*Viola cucullata* Ait. Common.
Arrow-leaved Violet	*Viola fimbriatula* Sm.
Lance-leaved Violet	*Viola lanceolata* L. Common.
Bird's-foot Violet	*Viola pedata* L. Common in one locality.
Woolly Blue Violet	*Viola sororia* Willd.
Swamp Loosestrife	*Decodon verticillatus* (L.) Ell. Common around some ponds.
Purple Loosestrife	*Lythrum Salicaria* L. Have found only one plant (1935).
Meadow-Beauty	*Rhexia virginica* L. Not common.
Great Willow-herb; Fire Weed	*Epilobium angustifolium* L. Occasional.
Purple-leaved Willow-herb	*Epilobium coloratum* Muhl. Occasional.
Marsh Purslane	*Ludvigia palustris* (L.) Ell. Occasional.
Evening Primrose	*Oenothera biennis* L. Common.
Mermaid-weed	*Proserpinaca palustris* L. Occasional.
Wild Sarsaparilla	*Aralia nudicaulis* L. Common in one station.
Water Hemlock	*Cicuta maculata* L. Common in swamps.

Wild Carrot	*Daucus Carota* L. Too common.
Scotch Lovage; Sea Parsley	*Ligusticum scothicum* L. Common along sea beaches.
Wild Parsnip	*Pastinaca sativa* L. Occasional.
Mock Bishop-weed	*Ptilimnium capillaceum* (Michx.) Raf. Rare.
Silky Cornus; Kinnikinnik	*Cornus Amomum* Mill. Occasional.
Flowering Dogwood	*Cornus florida* L. One tree known.
Black Gum	*Nyssa sylvatica* Marsh. Common in most of the swamps.
Spotted Wintergreen	*Chimaphila maculata* (L.) Pursh. Two stations known.
Sweet Pepperbush; Clethra	*Clethra alnifolia* L. Common.
Black Huckleberry	*Gaylussacia baccata* (Wang.) Koch. Fairly common.
Male Berry	*Lyonia ligustrina* (L.) DC. Occasional.
White Swamp Honeysuckle	*Rhododendron viscosum* var. *nitidum* (Pursh) Gray. Common in swamps.
High or Swamp Blueberry	*Vaccinium corymbosum* L. Common in swamps.
Large or American Cranberry	*Vaccinium macrocarpon* Ait. Fairly common in bogs.
Marsh Rosemary; Sea Lavender	*Limonium carolinianum* (Walt.) Britton. Common along shore.
Pimpernel	*Anagallis arvensis* L. Occasional.
Whorled Loosestrife	*Lysimachia quadrifolia* L. Fairly common.
Loosestrife	*Lysimachia terrestris* (L.) BSP. Occasional in swamps.
Steironema	*Steironema lanceolatum* (Walt.) Gray. Occasional.
Star Flower	*Trientalis americana* (Pers.) Pursh. Occasional.
Bartonia	*Bartonia virginica* (L.) BSP. Occasional.
Spreading Dogbane	*Apocynum androsaemifolium* L. Common.
Indian Hemp	*Apocynum cannabinum* L. Occasional.
Indian Hemp	*Apocynum cannabinum* var. *pubescens* (R. Br.) DC. Occasional.
Blunt-leaved Milkweed	*Asclepias amplexicaulis* Sm. Rare, one station known. Has now (1935) disappeared.
Hairy Milkweed	*Asclepias incarnata* var. *pulchra* (Ehrh.) Pers. Common.
Purple Milkweed	*Asclepias purpurascens* L. Rare. Found once in 1932.
Common Milkweed	*Asclepias syriaca* L. The commonest Milkweed.

Butterfly-weed	*Asclepias tuberosa* L. Fairly common.
Whorled Milkweed	*Asclepias verticillata* L. Fairly common.
Hedge Bindweed	*Convolvulus sepium* L. Common.
Hedge Bindweed	*Convolvulus sepium* var. *pubescens* (Gray) Fern.
Dodder	*Cuscuta Gronovii* Willd. A fairly common parasite.
Viper's Bugloss	*Echium vulgare* L. Known in one field only for years.
Blue Vervain	*Verbena hastata* L. Fairly common.
White Vervain	*Verbena urticaefolia* L. Occasional. One station, found 1934.
Henbit	*Lamium amplexicaule* L. Found only once.
Common Motherwort	*Leonurus Cardiaca* L. Fairly common.
Cut-leaved Water Horehound	*Lycopus americanus* Muhl. Common.
Bugle Weed	*Lycopus uniflorus* Michx. Fairly common.
White Horehound	*Marrubium vulgare* L. Formerly rare. Large colony found in 1935.
Corn Mint; Field Mint	*Mentha arvensis* var. *canadensis* (L.) Briquet. Occasional.
Catmint; Catnip	*Nepeta Cataria* L. Occasional.
Self-heal; Heal-all	*Prunella vulgaris* L. Common.
Narrow-leaved Mountain Mint	*Pycnanthemum flexuosum* (Walt.) BSP. Occasional.
Short-toothed Mountain Mint	*Pycnanthemum muticum* (Michx.) Pers. Occasional.
Sage	*Salvia sylvestris.* A very rare plant in this country. Station destroyed in building.
Marsh Skullcap	*Scutellaria galericulata* L. Fairly common.
Mad-dog Skullcap	*Scutellaria lateriflora* L. Fairly common.
American Germander	*Teucrium canadense* L. Common.
American Germander var.	*Teucrium canadense* var. *littorale* (Bicknell) Fernald. Common.
Blue Curls	*Trichostema dichotomum* L. Common.
Purple Thorn-Apple	*Datura Tatula* L. Common.
Matrimony Vine	*Lycium halimifolium* Mill. Several stations.
Violet Petunia	*Petunia violacea* Lindl. Probably an escape.
Clammy Ground-Cherry	*Physalis heterophylla* Nees. Fairly common.
Tall Hairy Ground-Cherry	*Physalis pruinosa* L. Found several years ago.
Ground-Cherry	*Physalis subglabrata* Mackenzie & Bush.
Horse Nettle	*Solanum carolinense* L. Found large colony in 1934.
Nightshade; Bittersweet	*Solanum Dulcamara* L. Common.
Black Nightshade	*Solanum nigrum* L. Common.

Beaked Nightshade	*Solanum rostratum* Dunal. Not recently found.
Turtle-Head	*Chelone glabra* L. Found only once.
Large Purple Gerardia	*Gerardia purpurea* L. Common.
Clammy Hedge-Hyssop	*Gratiola virginiana* L. Found several years ago.
False Pimpernel	*Ilysanthes anagallidea* (Michx.) Robinson. Occasional.
False Pimpernel	*Ilysanthes dubia* (L.) Barnhart.
Mudweed; Mudwort	*Limosella aquatica* var. *tenuifolia* (Wolf) Pers. Common.
Blue Toad-Flax	*Linaria canadensis* (L.) Dumort. Common.
Yellow Toad-Flax	*Linaria vulgaris* Hill. Common.
Paulownia	*Paulownia tomentosa* (Thunb.) Steud. Several trees.
Hare Figwort	*Scrophularia leporella* Bicknell. Several stations.
Moth Mullen	*Verbascum Blattaria* L. Rare. Found once.
Great Mullen	*Verbascum Thapsus* L. Common.
Purslane Speedwell	*Veronica peregrina* L. Common.
Thyme-leaved Speedwell	*Veronica serpyllifolia* L. Not common.
Bladderwort	*Utricularia clandestina* Nutt. Found once in 1920.
Beech-drops	*Epifagus virginiana* (L.) Bart. Several stations. Under Beeches.
Naked Broom-rape; Cancer-root	*Orobanche uniflora* L. One station 1933.
Large-bracted Plantain	*Plantago aristata* Michx. Common, sandy localities.
Seaside Plantain	*Plantago decipiens* Barneoud. Fairly common.
English Plantain; Rib-grass	*Plantago lanceolata* L. Very common.
Common Plantain	*Plantago major* L. Not as common as Rugel's Plantain.
Rugel's Plantain	*Plantago Rugelii* Dcne. Common.
Button-bush	*Cephalanthus occidentalis* L. Occurs in one or two swamps.
Cleavers; Goose-grass	*Galium Aparine* L. Occasional.
Clayton's Bedstraw	*Galium Claytoni* Michx. Fairly common.
Hairy Bedstraw	*Galium pilosum* Ait. Not recently found.
Stiff Marsh Bedstraw	*Galium tinctorium* L. Fairly common.
Sweet-scented Bedstraw	*Galium triflorum* Michx. Fairly common.
Japanese Honeysuckle	*Lonicera japonica* Thunb. Very common and well established for years.
Tartarian Bush-Honeysuckle	*Lonicera tatarica* L. Fairly common.
American Elder	*Sambucus canadensis* L. Very common.
Appalachian Tea	*Viburnum cassinoides* L. Occasional.

Arrow-wood	*Viburnum dentatum* L. Only one shrub known. May prove to be *V. venosum* Britton.
Wild Balsam Apple	*Echinocystis lobata* (Michx.) T. & G. Common in localities.
Sheep's-bit	*Jasione montana* L. Rare. One station known.
Venus Looking-Glass	*Specularia perfoliata* (L.) A.DC. Occasional. One station known.
Pale Spiked Lobelia	*Lobelia spicata* Lam. Fairly common.
Yarrow; Milfoil	*Achillea Millefolium* L. Common.
Ragweed; Roman Wormwood	*Ambrosia artemisiifolia* L. Very common.
Western Ragweed	*Ambrosia psilostachya* DC. Occasional.
Pearly Everlasting	*Anaphalis margaritacea* (L.) B. & H. Occasional.
Everlasting; Pussy Toes	*Antennaria fallax* Greene. Fairly common.
Plantain-leaf Everlasting	*Antennaria plantaginifolia* (L.) Richards. Fairly common.
Corn Chamomile	*Anthemis arvensis* L. Occasional.
Mayweed; Dillweed	*Anthemis Cotula* L. Common.
Yellow Chamomile	*Anthemis tinctoria* L. Sparingly as an escape.
Common Burdock	*Arctium minus* Bernh. Common.
Tall or Wild Wormwood	*Artemisia caudata* Michx. Fairly common.
Beach Wormwood	*Artemisia Stelleriana* Bess. Fairly common on beaches.
Whorled Aster	*Aster acuminatus* Michx. Occasional.
Common Blue Wood Aster	*Aster cordifolius* L. Occasional.
White Wood Aster	*Aster divaricatus* L. Occasional.
Bushy Aster	*Aster dumosus* L. Occasional.
Rush Aster	*Aster junceus* Ait. Occasional.
Smooth Aster	*Aster laevis* L. Occasional.
Starved Aster	*Aster lateriflorus* (L.) Britton. Occasional.
Stiff-leaved Aster	*Aster linariifolius* L. Very common.
Long-leaved Aster	*Aster longifolius* Lam. Long-leaved Aster.
Dense-flowered Aster	*Aster multiflorus* Ait. Common.
New England Aster	*Aster novae-angliae* L. Not common.
New York Aster	*Aster novi-belgii* L. Fairly common.
Tall White Aster	*Aster paniculatus* Lam.
Late Purple Aster	*Aster patens* Ait. Common.
Annual Salt-marsh Aster	*Aster subulatus* Michx. Fairly common.
Perennial Salt-marsh Aster	*Aster tenuifolius* L. Fairly common.
Tall Flat-topped White Aster	*Aster umbellatus* Mill. Occasional.
Small White Aster	*Aster vimineus* Lam. Common.
Groundsel Tree	*Baccharis halimifolia* L. Two bushes known. Since died.
Beggar-ticks	*Bidens connata* Muhl. Common.

Beggar-ticks	*Bidens vulgata* Greene. Common.
Musk Thistle	*Carduus nutans* L. Found several years ago.
Bachelor's Buttons	*Centaurea Cyanus* L. Occasional.
Knapweed	*Centaurea Jacea* L. Found several years ago.
Black Knapweed; Centaury	*Centaurea nigra* L. Very common.
Black Knapweed var.	*Centaurea nigra* var. *radiata* DC. Not as common as type.
Daisy; White-weed	*Chrysanthemum Leucanthemum* L. Common.
——— ———	*Chrysanthemum uliginosum* Pers. Found one year.
Sickle-leaved Golden Aster	*Chrysopsis falcata* (Pursh) Ell. One station known for many years, but has now disappeared.
Chicory; Blue Sailors	*Cichorium Intybus* L. Very common. Occasionally rose pink.
Canada Thistle	*Cirsium arvense* (L.) Scop. Very common.
Canada Thistle var.	*Cirsium arvense* var. *vestitum* Wimm. & Grab.
Field Thistle	*Cirsium discolor* (Muhl.) Spreng. Common.
Common Bull Thistle	*Cirsium lanceolatum* (L.) Hill. Fairly common.
Pasture Thistle	*Cirsium pumilum* (Nutt.) Spreng.
Tickseed	*Coreopsis lanceolata* L. Escaped from cultivation; very freely of late.
Tickseed	*Coreopsis tinctoria* Nutt. Found once. Apparently an escape.
Narrow-leaved Hawksbeard	*Crepis tectorum* L. Occasional.
Fire-weed	*Erechtites hieracifolia* (L.) Raf. Occasional
Canada Fleabane	*Erigeron canadensis* L. Common.
Philadelphia Fleabane	*Erigeron philadelphicus* L. Fairly common.
Daisy Fleabane	*Erigeron ramosus* (Walt.) BSP. The commonest species. Sometimes rayless.
——— ———	*Erigeron pusillus* Nutt. Apparently uncommon.
Hyssop-leaved Thoroughwort	*Eupatorium hyssopifolium* L. Found in 1916. Apparently restricted.
Boneset; Common Thoroughwort	*Eupatorium perfoliatum* L. Fairly common.
Hairy Thoroughwort	*Eupatorium pubescens* Muhl. Occasional.
Joe-Pye or Trumpet-weed	*Eupatorium purpureum* L. Not common.
Rough Thoroughwort	*Eupatorium verbenaefolium* Michx. Not common.
Galinsoga	*Galinsoga parviflora* var. *hispida* DC. Common. Cultivated soil.
Many Headed Cudweed	*Gnaphalium polycephalum* Michx. Occasional.

Low or Marsh Cudweed	*Gnaphalium uliginosum* L. Common.
Broad-leaved Gum-plant	*Grindelia squarrosa* (Pursh) Dunal. Found once in 1915.
Purple-head Sneezeweed	*Helenium nudiflorum* Nutt. Occasional. A new arrival.
Maximilian's Sunflower	*Helianthus Maximiliani* Schrad. Found once in 1909.
Prairie Sunflower	*Helianthus petiolaris* Nutt. Found once in 1905.
Pale-leaved Wood Sunflower	*Helianthus strumosus* L. Occasional.
Jerusalem Artichoke	*Helianthus tuberosus* L. Occasional.
Orange Hawkweed	*Hieracium aurantiacum* L. Occasional.
Canada Hawkweed	*Hieracium canadense* Michx. Common.
Gronovius' Hawkweed	*Hieracium Gronovii* L. Occasional.
Field Hawkweed	*Hieracium pratense* Tausch. Occasional.
Rough Hawkweed	*Hieracium scabrum* Michx. Occasional.
Long-rooted Cat's-ear	*Hypochaeris radicata* L. Fairly common.
Marsh Elder	*Iva oraria* Bartlett. Fairly common.
Burweed Marsh Elder	*Iva xanthifolia* Nutt. Found once in 1915.
Wild or Tall Lettuce	*Lactuca canadensis* L. Common.
Prickly Lettuce	*Lactuca scariola* L. Becoming common.
Fall Dandelion	*Leontodon autumnalis* L. Fairly common.
Scaly Blazing Star	*Liatris scariosa* Willd. Common.
Pineapple-weed	*Matricaria suaveolens* (Pursh) Buchenau. Common.
Scotch Thistle	*Onopordum Acanthium* L. Occasional. Becoming rarer.
Salt Marsh Fleabane	*Pluchea camphorata* (L.) DC. Very common around some of the ponds.
Rattlesnake-root; White Lettuce	*Prenanthes alba* L. Common.
Tall White Lettuce.	*Prenanthes altissima* L. Common.
Tall Rattlesnake Root	*Prenanthes trifoliolata* (Cass.) Fernald. Found in 1906.
Black Eyed Susan	*Rudbeckia hirta* L. Common.
Toothed White-topped Aster	*Sericocarpus asteroides* (L.) BSP. Occasional.
Golden-rod	*Solidago asperula* Desf.
White Golden-rod; Silver-rod	*Solidago bicolor* L. Occasional.
Bushy Golden-rod	*Solidago graminifolia* (L.) Salisb. Occasional.
Bushy Golden-rod var.	*Solidago graminifolia* var. *Nuttallii* (Greene) Fernald.
Early Golden-rod	*Solidago juncea* Ait. Fairly common.
Swamp Golden-rod	*Solidago neglecta* T. & G. Found 1906.
Gray or Field Golden-rod	*Solidago nemoralis* Ait. Probably the commonest species of genus.

Anise-scented Golden-rod	*Solidago odora* Ait. Not common.
Downy Golden-rod	*Solidago puberula* Nutt. Occasional.
Golden-rod	*Solidago rugosa* Mill. Common.
Sea-side Golden-rod	*Solidago sempervirens* L. Common.
Slender Fragrant Golden-rod	*Solidago tenuifolia* Pursh. Occasional.
Corn Sow-Thistle	*Sonchus arvensis* L. Common.
Spiny Sow-Thistle	*Sonchus asper* (L.) Hill. Occasional.
Annual Sow-Thistle	*Sonchus oleraceus* L. Occasional.
Red Seeded Dandelion	*Taraxacum erythrospermum* Andrz. Occasional.
Dandelion	*Taraxacum officinale* Weber. Common.
American Cocklebur	*Xanthium canadense* Mill. Found in 1906.
Cocklebur	*Xanthium echinatum* Murr. Fairly common.

Fishers Island, N. Y.

LOCAL FLORA NOTES

Weeds of New York

Joseph Monachino

The following are, with few exceptions, represented by specimens deposited in the Local Flora Herbarium of the New York Botanical Garden:

Aristida oligantha Michx. Sheepshead Bay, Brooklyn. Sept. Not as abundant as

Aristida tuberculosa Nutt. Richmond Valley, Staten Island, where lawns were covered with this long awned grass, reminiscent of its prolificness in southern New Jersey along the tracks of the N. J. Central R. R. Aug.

Arthraxon hispidus var. *cryptatherus* (Hack.) Honda. Near the propagating house, N. Y. Botanical Garden, Bronx. Oct. Hitchcock, Manual of the Grasses of the U. S., page 725. Annual, but self-seeding. Leaves like a common Panicum, inflorescence like a Digitaria, and related to neither, but to Andropogon, which it does not resemble, by organs that are usually missing (secondary spikelet and its pedicel)!

Bromus inermis Leyss. A few specimens in Jamaica, Queens; but seen in great quantities further east on Long Island out of the city limits. July.

Calamogrostis epigeios (L.) Roth. First collected Aug. 18, 1936, near Maspeth, Queens. First seen at several stations in Astoria e.g. Vernon Blvd. and Sanford St. In every case as a weed in dense showy colonies. Hitchcock, page 319.

Cenchrus tribuloides L. Plum Island, Marine Park, Brooklyn. Nov. Together with *Cenchrus pauciflorus* Benth. As prosperous as in the Atlantic Highlands or Staten Island, thus completing the arc of distribution on the land sides of the Lower Bay.

Corynephorus canescens (L.) Beauv. South Jamaica. July. Hitchcock, page 294. Still doing fine; in an adventurous mood, it has crossed Cross Bay Blvd.

Hordeum jubatum L. Occasionally throughout, e.g. Sheepshead Bay, Canarsie, Brooklyn; Cornell Neck, Bronx. June.

Panicum scoparium Lam. South of reservoir, Central Park; Conselyea Pond, Jamaica. July. Observed for a half dozen years at first locality. The velvet panic grass is easily distinguished from other Panicums by its pubescence which is velvety as in *Holcus lanatus*.

Setaria ambigua Guss. Queens, e.g. Vernon Blvd. and 46th Ave., Long Island City. Manhattan, in the cracks of pavements near sides of buildings. Sept. Hitchcock, page 699, as var. of *S. verticellata*.

Setaria italica (L.) Beauv. Sporadically throughout the city, sometimes in small colonies. Aug.

Cyperus Schweinitzii Torr. Cross Bay Blvd., across Jamaica Bay, Queens. Also at Plum Island, Brooklyn. June.

Salix longifolia Muhl. Canarsie and Barren Island, Brooklyn. Generally along southern coast of Long Island. June.

Cannabis sativa L. Throughout, including back yards. June.

Parietaria pennsylvanica Muhl. Near Westchester Creek, Bronx. Sept.

Atriplex rosea L. Coney Island, Brooklyn; Astoria, Queens. Aug.

Bassia hyssopifolia (Pall.) Kuntze. Near juncture of Flushing Bay and Flushing Rv., Corona, L. Is., also at Bowery Bay, Astoria; near Newton Creek, Queens. Sept. ½′ to 4′ high, rounded and compact, stem becoming shining red. Like a great Dondia, but fruiting calyx with a ring of peculiar incurved horns.

Cycloloma atriplicifolium (Spreng.) Coult. Southern L. Is., Sheepshead Bay, Barren Island, Canarsie, South Jamaica. Also in Corona, Queens. June.

Allionia nyctaginea Michx. Common in Long Island City and Astoria, western Queens. July.

Silene Czerci Baumg. Canarsie, Brooklyn. June. Somewhat like a huge *Silene latifolia*. Besides specimens, a seed collection at N. Y. B. G.

Lepidium latifolium L. Flushing, near Flushing Bay. June. Showy, 3′ to 5′ tall, flowers in corymbose panicle, white, fragrant like sweet alyssum. More corymbose than typical European specimens.

Rapistrum rugosum (L.) All. Coney Island. July.

Vicia villosa Roth. Several stations in Bronx. Aug.

Conium maculatum L. Flushing. June.

Tribulus terrestris L. Yard at 11th Ave. & 41st St., Manhattan. July. Certain to be shortly doomed.

Tithymalus Esula (L.) Hill. Pelham Bay Parkway entrance to Bronx Dale, Bronx Park. May. Seen for several years but never in fruit.

Epilobium hirsutum L. Flushing and Bronx. Aug.

Heracleum spondylium L. Near north entrance to N. Y. Bot. Garden, Bronx. July. Has been observed to flourish for several years. Quite distinct in most characters from *H. lanatum* Michx; which is the common species in the Park. Typical leaves 5 lobed.

Verbena bracteata Lag. & Rodr. Barren Island, Brooklyn. Aug.

Verbena stricta Vent. Flushing. July.

Ballota nigra L. Cornell Neck, Bronx. July.

Solanum villosum Mill. Flushing. Sept. Replaced *S. nigrum*.

Plantago arenaria W.&K. Quite common throughout, more so than *P. aristata* Michx. July.

Sesamum indicum L. Corona, L. Is. Oct. Growing in cindery soil with aspects of a plantation. Seeds ripe.

Galium erectum Huds. Near Newton Creek, Greenpoint, Brooklyn. Sept.

Triosteum perfoliatum L. Western Pelham Bay Park and VanCortlandt Park; Bronx; not as profuse as on Snake Hill, Hudson Co., New Jersey. July.

Iva xanthiifolia Nutt. (*Cylachaena xanthiifolia* Fresen.) Queens, e.g. Vernon Blvd. & 34th Ave. With prolific pollen. Sept.

Artemisia annua L. Many localities in Queens. Summer.

Boltonia asteroides (L.) L'Her. Near Westchester Creek, Bronx. Sept.
Boltonia latisquama A. Gray. New York Bot. Garden. Autumn.
Carduus nutans L. Near Flushing Bay, Flushing; in swampy grounds near 73 Ave. & Queens Blvd., Queens: a colony with suberect heads. July.
Coreopsis lanceolata L. Queens, a frequent escape. June.
Guizotia abyssinica Cass. Corona, Queens. Oct. With the aspects of a robust *Bidens cernua.*
Helianthus hybrid No. 194. Corona. Sept. Resembles *H. ambiguus* (A. Gray) Britton but stem smooth above. Associates: *H. giganteus* L., *H. divaricatus* L., *H. strumosus* L.
Helianthus hybrid No. 196. With No. 194 and similar but upper leaves alternate.
Liatris scariosa Willd. Corona. Sept. In south Jamaica, with *L. spicata* Willd. and an intermediate hybrid.
Matricaria matricarioides (Less.) Porter. Several southern districts in Brooklyn and Queens. June.
Lactuca pulchella (Pursh) DC. Flushing. July. Growing with *Lepidium latifolium* L. Aspects of chickory.
Hieracium florentinum All. Hardly less common than *H. pratense.* Aug.

New York Botanical Garden,
Bronx, N. Y.

Back-tracking New Jersey Plants

John A. Small

On a field trip last fall (September 30, 1939) under the guidance of Dr. Meredith Johnson, New Jersey State Geologist, a search was made for fossil plants in the limonitic sandstone of the Pensauken formation in East Brunswick Township. This locality, the only one reported of its kind, was discovered by Dr. Alfred Hawkins some ten years ago. It is a very small area. A good number of imprints were found but they showed only fragments of leaves. The original collection had removed the best of the exposed material. None of us were sufficiently trained paleobotanists to name the species found. The earlier collections were studied by Dr. Edward W. Berry and published with Dr. Hawkins as "Flora of the Pensauken Formation in New Jersey" in the Bulletin of the Geological Society of America, vol. 46, 1935. Eleven species were reported: *Onoclea sensibilis, Salix humilis, Castanea*

dentata, Platanus occidentalis, Magnolia virginiana, Cebatha carolina, Philadelphus inodorus, Persea borbonia, Sassafras officinale, Gaylussacia dumosa, and *Viburnum alnifolium.* All of these plants are still thriving species although three of them no longer range this far north. But the Pensauken rocks were laid down during an interglacial period of the Pleistocene, or perhaps before the Jerseyan glaciation.

BOOK REVIEWS

Basic Course in Botany*

J. W. Thomson, Jr.

The aim of this new addition to the ever-increasing list of textbooks in general introductory botany is an attempt "to emphasize the essentials of science, and especially the broad, biological point of view, more consciously and persistently than is done in similar works." To achieve this aim, the first two chapters are devoted to "the point of view" and "biological fundamentals," and throughout the book an introduction to each topic stresses generalizations which are then discussed in greater detail.

In general content the new text is similar to previous texts. After a consideration of plant cells and their activities, the tissues and organs of the plant; roots, stems, leaves, flowers, fruits and seeds are taken up. The activities of the organs are discussed in the same chapters as the structures. Following the chapters upon anatomy and physiology, the plant kingdom is well covered in eight chapters. The chapters "plants and their environment" and "plant communities and vegetation regions" give, as would be expected from Dr. Pool, a better consideration of plant ecology than many other general texts. These chapters are limited to North American vegetation. Pathology and heredity and evolution are also given chapters.

While some of the diagrams intended to simplify general principles seem unnecessarily complicated, and some of the photographs

* Basic Course in Botany. Raymond J. Pool. v + 654 pages. Ginn and Co. 1940. $3.75.

such as those of *Selaginella* and lichens forming a turf, or scales on the bark of the ponderosa pine, would not be clear to the student, the choice of illustrations on the whole is good. One would wish, perhaps, for more thorough labeling of parts. An interesting variation from most texts is the number of illustrations taken from old sources; Hooke, Grew, Mattioli, and Linnaeus.

The Pool text is an excellent addition to the more complete type of treatments of introductory botany and will prove valuable to those who wish to utilize in a full year course the particular point of view as well as thoroughness of text which is presented.

Liverworts of Southern Michigan*

M. Fulford

In a concise little book, Liverworts of Southern Michigan, Dr. Steere has given a non-technical treatment of the local species whereby a beginner may, of his own accord, either in the field or laboratory, learn to recognize and identify the various local species with the aid of a good hand lens.

After an introductory section in which the author discusses briefly and clearly the structure and classification of liverworts, where they grow and how to preserve them, the genera and species are described. These descriptions are brief and to the point, but give ample details of the plants involved.

The *Key to the Genera* is particularly good and should afford no serious difficulties for the beginner. The photographs by Dr. E. B. Mains and the line drawings by Miss Embry are excellent.

The author has admirably accomplished his purpose, and we are sure that anyone wishing to begin the study of hepatics in this region will find this book to be of great assistance. We only wish that more species of these infrequently recognized little plants grew in Southern Michigan.

The book is another of the series of manuals of Natural History pertaining to Southern Michigan but of use over a much wider area.

* Liverworts of Southern Michigan. William Campbell Steere. Cranbrook Institute of Science. Bull. 17. 97 pages. 22 plates. Bloomfield Hills, Michigan. Price $0.50 paper. $1.00 waterproof cloth.

Ammons' Liverworts of West Virginia*

Edwin B. Matzke

Although many botanists, both amateur and professional, are rather intimately acquainted with certain groups of the lower plants, such as the mosses and lichens, very few seem to have much knowledge of the liverworts, except perhaps of Marchantia. Over large areas of the United States, including the northeast, other hepatics are much more abundant than Marchantia, which after all is hardly a "typical liverwort"—being in many ways the most specialized of the entire group. Its popularity seems to rest largely on the very beautiful set of charts illustrating its structure and life history made by Kny many years ago and on the dearth of adequate treatment of the other genera of liverworts due to a paucity of books dealing with the group.

This situation is being remedied, however, and "The Liverworts of West Virginia" is a welcome addition to botanical libraries. West Virginia is obviously a happy hunting ground for the hepatics. Its rugged surface, its mountains, hills, and valleys, its waterfalls, streams, and swamps, together with its natural forest climax, all combine to furnish the types of habitats which the various members of this group of plants require. Consequently, although this is a manual devoted modestly to the hepatics of a single state, it really has a much wider application. For instance, all the genera of liverworts but two, and most of the species described by Howe in the later editions of Grout's "Mosses With a Hand Lens," are found in West Virginia, and as would be expected, there are many additional forms given for that state not included in "Grout."

The keys to both the genera and the species are based largely on vegetative characters; although many of the liverworts fruit abundantly, their sporophytes are more delicate than those of the mosses and do not persist; consequently such keys are especially helpful.

The scheme of classification used is that proposed by Evans (1939). The acrogynous Jungermanniales are considered first, then the anacrogynous forms, followed by the Marchantiales and

* A Manual of the Liverworts of West Virginia. By Nelle Ammons. 164 pp. 26 plates. University Press, Notre Dame, Ind. 1940. $1.75.

Anthocerotales. Twenty families are listed for the Jungermanniales, including forty-six genera; the Marchantiales include three families and eight genera, while two genera in a single family are taken up in the Anthocerotales.

In each case there are genus descriptions, which give the reproductive as well as the vegetative features. The derivation of the name is also made clear, and synonyms with references are listed. In the very adequate species descriptions the gross features as well as the more obvious microscopic characters are portrayed, together with data on distribution, habitat, and additional information of interest.

Every species described is illustrated with clear line drawings, showing a habit sketch magnified three times and, for the most part, dorsal and ventral views, cellular features, spores, elaters, etc., wherever these are diagnostic or characteristic.

The book is also equipped with a glossary, an appendix explaining species names, and an extensive bibliography.

The author has prepared a volume that is at once scholarly and usable and one that merits appreciation by students of the liverworts.

Remarks made at the annual meeting of the Torrey Club by Dr. B. O. Dodge on his election as President of the Club

I am reminded this evening by the results of the election just reported, of an incident that occurred soon after we first came to New York some thirty years ago now. One day Professor Curtis, who was then acting head of the Department of Botany at Columbia, was telling me about the Torrey Botanical Club. He took me into the room next to his office where the publications of the Torrey Club were stored. He showed me volumes of the Memoirs, especially Salmon's Monograph of the Ersiphaceae and Griffith's Monograph of the Sordariaceae and Hazen's Ulothricaceae. He also showed me some volumes of TORREYA. He seemed to take great pride in the *Bulletin,* however. He said, "You know our *Bulletin* is one of the oldest (he may have said *the oldest*) botanical Journals in America." It is a fact, our Club is the oldest and the largest botanical organization in America that holds regular monthly

meetings throughout the academic year. "You know, Dodge," he said, "we have been holding these monthly meetings now for over forty years." The way he used the personal pronouns "we" and "our" impressed me very much, as though he had a great personal interest in the club and was probably one of the leaders. In any event, he must have had some influence because a few weeks later I was proud to learn that I had been elected a member of this noted club. Anyone should be proud to belong to a Society with such a wide international reputation because of the contributions made by its members to our knowledge of plant life.

It would be interesting if Dr. Moldenke who is such an enthusiast for details, or Dr. Barnhart, who loves to deal with things bibliographic, would prepare a bibliography of all the publications put out by all of the members of the Torrey Botanical Club for the past seventy years. By comparing this bibliography with a similar one covering the great Botanical Societies of Europe, we might discover a new *superlative* which we could use in telling our young people about the Torrey Club.

Since first becoming a member of this Organization, thirty years ago, I have joined quite a number of botanical societies and scientific organizations of one kind or another as many of you here have also done. I am sure, though, that we all feel that the Torrey Club is our own Club, our own organization, a sort of family affair, and as such, we owe it a certain special loyalty. For example, loyalty to support its publications not only financially but also scientifically, which is perhaps more important. It might be well if members of the Club after they have finished a piece of research and have written up a manuscript for publication, if it is one about which the author could say to himself, "This is one of my most important contributions to botany," it might be the *loyal thing* to send the manuscript to the editor of the Torrey Club.

It is unnecessary to say that I appreciate very much your electing me to be your presiding officer for the coming year. In accepting the honor of the office I also accept the obligations and duties of the office especially to work with the Council and other officers and members to the end that the affairs of the Club shall be administered in such a way that its high standard and prestige shall at least not be lowered. Thank you again.

FIELD TRIPS OF THE CLUB

Trip of February 11 to the Paleobotanical Museum of the New York Botanical Garden

Fourteen members and friends of the club assembled at 1.30 p.m., for a short classroom introduction to the subject of the fossil plants of New York and New Jersey. The general geologic setting of the Triassic, Cretaceous, and Tertiary deposits of the region was presented and the problems of identification of fossil plants were discussed.

The party thereafter was conducted through the paleobotanical hall of the museum and was shown representative specimens of many of the plants which formerly inhabited the Atlantic seaboard. Special emphasis was placed on those families and genera which reached their climax of abundance, diversification, and distribution many millions of years ago and which today survive only as relicts of their glorious past. Among the notable examples seen and discussed were: the Cycadaceae and Araucariaceae of both the Triassic and Cretaceous, and *Sequoia, Ginkgo, Liriodendron, Sassafras,* and *Platanus* of the Cretaceous. It was further pointed out that certain of the Cretaceous species, notably of the conifers *Moriconia* and *Brachyphyllum,* were of types which have apparently left no survivors in our modern forests.

This observation led very naturally to a consideration and examination of other extinct groups, chiefly of Carboniferous age, which are on display in the museum. Among the groups examined and discussed were specimens of seed ferns, and of *Lepidodendron, Sigillaria,* and *Calamites.*

For their courtesy and cooperation, the club is indebted to the New York Botanical Garden, which was represented by Dr. H. N. Moldenke.

Erling Dorf

Mohonk Sugar Bush Trip, March 8-10

The sugar bush outing proved to be a unique experience for the score of people who attended. The grip of winter had not been broken in the Shawangunks, so winter sports were thoroughly enjoyed. There was fine skating on the lake and coasting and skiing on the hills. A hard crust on top of sixteen inches of snow made walking easy and pleasant.

Saturday afternoon we started out by sleighs to the accompaniment of jingling bells. It was a merry sight. From the end of the road it was only a short walk to the sugar bush which was being operated by a group of Mohonk School boys as their spring project. Due to the late winter the season had just begun, but the temperature was high enough for the sap to be running and the "first run" was boiling in the great black kettle so we were able to experience the sights, sounds and smells that give such fascination to maple syrup making in the old-fashioned way.

From the sugar bush we walked and slid down through cedar dotted pastures. The sliding was in huge dishpans which had been brought along for the purpose. One's destination was unpredictable and the frequent upsets were highly amusing to the onlookers. Many animal tracks were noted—the skunk being most frequent. The prints of a very large buck were seen.

Supper was cooked by the leader at the old log cabin under the watchful eyes of many experts. Steaks, potatoes with onions and coffee disappeared in great quantities. The singing of old-time songs to the accompaniment of the accordion put us in the mood for the sleigh ride up the mountain. The stars were very brilliant and the northern lights put on a display for us, while nearby the kerosene lanterns cast weird shadows among the trees.

Daniel Smiley, Jr.

PROCEEDINGS OF THE CLUB

The Annual Meeting, January 9, 1940

The Torrey Botanical Club held its annual meeting and dinner on January 9, 1940, at the Men's Faculty Club at Columbia University.

One hundred and five members and friends were present.

The following were elected to membership: *Annual:* Mr. Sanford S. Tepfer, 1354 East 19th St., Brooklyn, New York (transfer from Associate); and Dr. Herschell Fox, 237 East 20th Street, New York, N. Y. *Associate:* Miss Grace G. Lyman, 197 Main St., Easthampton, Mass. (transfer from Annual); Mr. Spencer Scott Marsh, Midwood Terrace, Madison, N. J. (transfer from Annual); Mrs. Spencer Scott Marsh, Midwood Terrace, Madison, N. J.;

and Miss Irene M. McLaughlin, 707 Gramatan Avenue, Mt. Vernon, N. Y.

The following resignations were accepted with regret: *Annual:* Mr. Henry Morrell, The Players, 16 Gramercy Park, New York, N. Y.; and Dr. R. Kent Beattie, 2032 Belmont Road, N. W., Washington, D. C.; *Associate:* Miss Helen Blanchard, 561 West 143rd Street, New York, N. Y.; and Miss Mary A. Clark, Bedford, N. Y.

Annual reports were given by all officers, delegates, and committee chairmen of the Club.

Attention was called to the fact that a new address book of taxonomists, geographers and ecologists is being prepared and that anyone who wishes his name to be included in this book should communicate with Dr. E. D. Merrill of Boston, Mass.

The result of the ballots for the election of officers for next year was read by the corresponding secretary whom the Club instructed to cast a final ballot for their election. The newly elected officers for 1940 are listed on the inside of the front cover.

Dr. B. O. Dodge on accepting the office of President of the Torrey Botanical Club stressed the importance of the members supporting the Club's publications not only financially but, what is more important, scientifically and that each member should take a personal interest and be loyal to the Club because it is his organization.

Dr. Graves in his retiring address spoke briefly of the Club's early history.

Dr. Karling proposed three objectives toward which the Club should strive during 1940:

1. A Torrey lecture known as the John Torrey address and that a fund known as the Torrey fund be started.

2. That there be greater and closer cooperation of the Torrey Club with the A. A. A. S. He suggested the possibility of a Torrey symposium held on one afternoon during the Christmas meetings of the A. A. A. S.

3. That the Torrey Club sponsor a Pan-American Botanical Congress.

It was further suggested that such addresses and papers of symposia be published in the *Bulletin* of the Club.

CLYDE CHANDLER
Recording Secretary

Meeting of January 17, 1940

The meeting of the Torrey Botanical Club held at the New York Botanical Garden on January 17, was called to order by the president at 3.35 p.m.

Forty-eight persons were present.

The minutes of December 20, 1939 and January 9, 1940 were adopted as read.

It was moved by Dr. Karling and seconded by Dr. Zimmerman that the secretary cast a unanimous ballot for the election of the following members: *Annual:* Dr. Fred J. Seaver, New York Botanical Garden, Bronx Park, New York; Mr. Charles Gilly, New York Botanical Garden, Bronx Park, New York; and Mr. Arthur Davidoff, 725 West 172nd Street, New York. *Sustaining:* Dr. José Sáer d'Heguert, 98 Martin Tovar, Valencia, Venezuela.

The death of Prof. H. M. Jennison, Department of Botany, University of Tennessee, Knoxville, Tenn., was noted with regret.

The resignation of Mrs. Frederick Kavanagh as Bibliographer of the Club was accepted with regret. An unanimous ballot was cast for the election of Mrs. Lazella Schwarten to fill this vacancy.

As Dr. E. B. Matzke, an elected member to the Council, was elected second vice-president of the Club which automatically made him an ex-officio member of the Council, the Council nominated Dr. P. W. Zimmerman for election to fill the vacancy. Dr. Gleason moved and Dr. Karling seconded that the secretary be instructed to cast an unanimous ballot for the election of Dr. Zimmerman.

Dr. Karling announced that contributions to the Torrey Fund would now be accepted and that an artist at Columbia had volunteered to design the medal.

Mrs. Wanda K. Farr presented the results of her research on the "Formation of Cellulose Particles in Halicystis." The speaker's abstract follows:

"*Cellulose* and *starch* are compounds of carbon, hydrogen, and oxygen formed exclusively in the protoplasm of living plant cells. Although closely related to sugars and other carbohydrates of protoplasmic origin, they are classed also with those substances which, in the form of single crystallites or crystalline aggregates, are morphologically visible. Starch serves primarily as a food reserve; cellulose, as an important constituent of the framework of the plant.

Starch, in the form of grains of many shapes and sizes, is produced within a specialized organ of the protoplasm—a plastid. If the starch-forming plastids

contain chlorophyll or other pigments they are called chloroplasts or chromoplasts; if they are colorless, they are called leucoplasts. For almost a century microscopists have been able to observe the formation of starch in the plastids of living cells and have found it to be one of the most common and most conspicuous constituents of living protoplasm.

Cellulose has been more elusive and its microscopic identification in the living protoplast, long delayed. Until recently it was not known to exist as a crystalline entity in the living cell before it made its appearance in the cell wall. In 1934 cellulose crystallites in the form of barely visible, ellipsoid particles [(1.1 x 1.5 microns) or (0.00004 x 0.00006 inch)] were observed and identified in the protoplasm of many types of cells from various parts of the plant kingdom. Subsequent studies in which microscopic, chemical, and X-ray diffraction techniques have been used have confirmed and extended these observations.

The accumulated data have furnished no clew, however, to the place of origin of the cellulose particles in the living protoplast. Within recent months we have turned our efforts in this connection toward a more careful study of the protoplasmic constituents of some of the large single-celled, marine algae. The first observations which we have to report have been made upon the green alga, *Halicystis,* obtained from Bermuda through the courtesy of Doctor J. F. G. Wheeler of the *Bermuda Biological Station for Research.*

In the young, disc-shaped chloroplasts of these large cells there are two small, ring-shaped structures, usually placed so that an imaginary line passing through the central axis of each ring would lie approximately parallel to the major axis of the plastid disc. As the chloroplast enlarges there is a successive formation of new rings of larger diameter but equal thickness immediately inside the plastid membrane. These larger rings disintegrate within the plastid into uniform-sized particles. After the formation and particulate disintegration of two or more large rings, the chloroplast membrane itself breaks down, releasing into the outer regions of the cytoplasm, the entire plastid content. This material of plastid origin goes directly into the formation of the lamellae of the cell membrane. The two small rings disintegrate, each into four particles, either before the breakdown of the plastid membrane, after the breakdown of the plastid membrane, or after the deposition of the plastid material in the cell membrane. THESE UNIFORM-SIZED PARTICLES RESULTING FROM THE DISINTEGRATION OF THE RINGS FORMED WITHIN THE CHLOROPLAST WE HAVE IDENTIFIED AS MERCERIZED CELLULOSE BY BOTH MICROSCOPIC AND X-RAY DIFFRACTION ANALYSES.

"Mercerized" cellulose was first produced by John Mercer in 1844 through the treatment of the "native" cellulose of cotton fibers with solutions of strong sodium hydroxide. Cellulose particles mercerized by this method can be distinguished from native cellulose particles by their blue coloration in solutions of iodine (I_2KI) without previous treatment with strong acid, and by their characteristic X-ray diffraction pattern. Doctor van Iterson of Delft observed in 1936 that the cell membrane of *Halicystis* turns blue when treated with

iodine solutions and questioned, therefore, the cellulose nature of the crystalline membrane material which is clearly doubly-refractive in polarized light. Doctor Sisson of our department found in 1938 that the X-ray diffraction pattern of the cell membrane of *Halicystis* showed the presence of mercerized cellulose and the absence of native cellulose. This represented the first recorded observation of the presence of mercerized cellulose in an untreated plant cell membrane and explained the color reaction of the membrane in iodine solutions. There is, therefore, this limited but important background of accumulated facts with which to correlate our present data and assist in confirming our conclusion that MERCERIZED CELLULOSE PARTICLES ARE FORMED IN THE LIVING CHLOROPLAST OF HALICYSTIS AND THAT THEY, WITH THEIR ASSOCIATED MATERIAL OF PLASTED ORIGIN, GO DIRECTLY INTO THE FORMATION OF THE LAMELLAE OF THE CELL MEMBRANE.

The question at once arises as to whether or not the process of formation of cellulose particles within plastid-like structures in plant cells is restricted to mercerized particles in chlorophyll-containing plastids. These questions have been answered by a reinvestigation of the protoplasm of the developing cotton fiber. Our previous study of the young cotton fiber had dealt only with the identification of cellulose particles scattered separately in the cytoplasm and their behavior during fibril formation and subsequent deposition in the membrane. We now find in the cytoplasm, in corresponding stages of fiber development, structures which are circular in outline, variable in size, colorless, and so close in their refractive index to the cytoplasm itself that they are very nearly invisible. After removal of these structures from the fibers under carefully controlled osmotic conditions, their contents are more clearly visible. THE FORMATION OF "NATIVE" CELLULOSE PARTICLES IN THE COLORLESS PLASTID-LIKE STRUCTURE OF THE COTTON FIBER BY A PROCESS OF RING-FORMATION SIMILAR TO THAT OF MERCERIZED PARTICLE FORMATION IN HALICYSTIS CAN THEN BE OBSERVED.

The formation of mercerized cellulose particles in the chloroplast of *Halicystis* and of native cellulose particles in the colorless plastid of the cotton fiber takes place, therefore, by structural processes which are visible and essentially similar. In each instance the concentric rings of varying diameter but equal thickness make possible, through ring disintegration, the formation of cellulose particles of characteristic uniformity in size. This process of cellulose particle formation has no morphological similarity to the well-known appearance of starch grain formation in either chloroplasts or leucoplasts. Upon the basis of these observations THE EXISTENCE OF CELLULOSE-FORMING PLASTIDS IS THEREFORE DEFINITELY ESTABLISHED.

The knowledge that fully formed cellulose particles are discharged into the cytoplasm by the rupture of the membrane of the plastid in which they have been formed serves to clear away the mystery of the sudden appearance of crystalline cellulose particles in living cells. The fact that cellulose particles can be formed in either a chloroplast or a colorless plastid, and in either the

mercerized or native state is, however, the consideration of paramount importance and its recognition will enable us to attack, with renewed hope, the solution of the many difficult problems concerned with the synthesis of carbohydrates in the living cell."

CLYDE CHANDLER
Recording Secretary

MEETING OF FEBRUARY 6, 1940

The meeting of the Torrey Botanical Club held at the American Museum of Natural History February 6, was called to order by the President at 8.15 p.m.

Seventy-six persons were present.

The minutes of the meeting of January 17 were adopted as read.

It was moved by Dr. E. W. Sinnott and approved by the Club that the secretary cast an unanimous ballot for the election of the following to membership in the Torrey Club.

Annual: Mr. Robert E. Duncan, 41 Coburn Hall, University of Maine, Orono, Me.; Mr. Edwin De T. Bechtel, 2 Wall Street, New York; Mrs. Donald Durant, 419 East 57th Street, New York; Mr. O. G. Fitzgerald, Room 844, 641 Washington Street, New York; Mrs. Richard Fondiller, 119 West 71st Street, New York; Mr. George Thomas Johnson, Dept. of Botany, Washington University, St. Louis, Mo.; and Mr. Rogers McVaugh, 2044 Pierce Mill Road, N. W., Washington, D. C.

Transfer from associate to annual: Prof. J. E. Weaver, University of Nebraska, Station A., Lincoln, Neb., and Mrs. Lazella Schwarten, New York Botanical Garden, Bronx Park, New York.

Associate: Mrs. Regina Jais, 1016 Fifth Avenue, New York; Mr. D. Yardeni, 14 Mount Hope Place, Bronx, New York; Mrs. Vance R. Hood (Elizabeth Hood), 456 Rockaway Avenue, Boonton, N. J., and Mr. Robert L. Fowler, Department of Botany, University of Nebraska, Lincoln, Neb.

Professor Harold St. John presented an interesting and well illustrated lecture on "The Jungles of Fiji."

CLYDE CHANDLER
Recording Secretary

MEETING OF FEBRUARY 21, 1940

The meeting of the Torrey Botanical Club held at the New York Botanical Garden on Wednesday, February 21, was called to order by the President at 3.30 p.m.

Thirty-four persons were present.

The minutes of February 6 were adopted as read.

Thirty-two people were elected to annual membership: Prof. Themistocles F. Acconci, Manhattan College, New York; Prof. Irving W. Bailey, Biological Laboratories, Harvard University, Cambridge, Mass.; Dr. Tibor Benedek, 25 East Washington Street, Chicago, Ill.; Dr. Anton H. Berkman, College of Mines, El Paso, Texas; Dr. Hugo L. Blomquist, Dept. of Bot., Duke Univ., Durham, N. C.; Dr. Vernon I. Cheadle, Botany Dept., Rhode Island State College, Kingston, R. I.; Dr. Alfred E. Clarke, 8318 16th St., Silver Spring, Md.; Mr. Arthur LeRoy Cohen, Biological Laboratories, Harvard University, Cambridge, Mass.; Mr. George H. Conant, Ripon, Wis.; Dr. Henry S. Conard, Grinnell College, Grinnell, Iowa; Dr. Lester Peter Coonen, De Sales College, Toledo, Ohio; Dr. Gertrude Elizabeth Douglas, 205 Lancaster Street, Albany, N. Y.; Mrs. Frederic W. Goddard [Gladys B.], 747 Dixie Lane, Plainfield, N. J.; Dr. Sam Granick, Rockefeller Institute for Medical Research, 66th Street and York Ave., New York; Dr. Charlotte L. Grant, 3302 Grace Land Ave., Indianapolis, Ind.; Dr. J. M. Greenman, Missouri Botanical Garden, St. Louis, Mo.; Mrs. R. M. Gunnison, 47 Brewster Road, Scarsdale, N. Y.; Dr. Stuart K. Harris, 33 Lebanon St., Winchester, Mass.; Dr. Gail Hamilton Holliday, 85 31st St., Wheeling, W. Va.; Miss Olivia Erdmann Kuser, Titusville, N. J.; Dr. W. E. Loomis, Dept. of Bot., Iowa State College, Ames, Iowa; Dr. Gaspar A. Loughridge, 122 Farm St., Ithaca, N. Y.; Dr. H. J. Lutz, Yale School of Forestry, New Haven, Conn.; Mr. H. H. McKinney, Virus Laboratory, U. S. Bureau of Plant Industry, Arlington Farm, Arlington, Va.; Dr. Morris Moore, The Barnard Free Skin and Cancer Hospital, 3427 Washington Boulevard, St. Louis, Mo.; Mr. Robert L. Piemeisel, Box 826, Twin Falls, Idaho; Dr. Herbert Parkes Riley, Department of Botany, University of Washington, Seattle, Wash.; Dr. Neil E. Stevens, Dept. of Bot., University of Illinois, Urbana, Ill.; Mr. George Lincoln Teller, 31 North State St., Chicago, Ill.; Dr. Joseph Aaron Trent, State Teachers College, Pittsburg, Kan.; Mr. Maurice Burke Walters, 14556 Superior Road, Cleveland Heights, Ohio; and Dr. Coaracy M. Franco, Instituto Agronomico do Estado, Campinas, Sao Paulo, Brazil.

Mr. Charles F. Doney, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y., was elected to associate membership.

Dr. Archer M. Huntington, 1 East 89th Street, New York, was elected to life membership in the Club.

The resignation of Miss Wellmer Pessels, 47 West 55th Street, New York, was noted with regret.

The auditing committee, composed of Mr. Henry de la Montagne and Dr. A. B. Stout, who called to their assistance Mr. E. J. Countey, made the following report: Treasurer's books examined and found correct, January 30, 1940. Certain recommendations made by the Committee are in the hands of the President of the Club.

The President made the following announcements:

(1) On March 6th at 4 p.m. Mr. Rutherford Platt will show colored pictures of autumn woods. This show will be held in the McMillan Theater at Columbia University.

(2) Dr. Harold N. Moldenke will receive contributions to a fund to be used toward the purchase of a piece of land, Anthony's Nose, for a memorial to the late Raymond H. Torrey.

(3) At the next meeting of the Club Dr. Harold N. Moldenke will speak on: "A Naturalist in Florida."

The scientific program consisted of a talk on The Relation Between the Sporophyte and Gametophyte in the Bryophytes, by Dr. Harold C. Bold of Barnard College.

The speaker's abstract follows:

"Current accounts of the Morphology of the Bryophyta are in error in minimizing the occurrence and importance of photosynthesis in the nutrition of the sporophyte. It is apparently universal and begins at an early stage continuing throughout the ontogeny of the sporophyte. Although this was known over a hundred years ago its significance was not understood. It has apparently been forgotten or overlooked because most modern studies are based on the analysis of fixed and stained material. The Bryophyte sporophyte is therefore largely "independent" of its gametophyte for carbohydrate nutrition and is more properly described as "epiphytic" rather than as "parasitic." The theories of antithetic alternation and progressive sterilization as applied to the Bryophyta have been important factors in delaying recognition of the occurrence of photosynthesis in the sporophytes of these plants. The homologous theory of alternation of generations receives support from and is in accord with these observations."

The meeting adjourned at 4.30 p.m. after which tea was served by the New York Botanical Garden.

Clyde Chandler
Recording Secretary

Meeting of March 5, 1940

The meeting of the Torrey Botanical Club held at the American Museum of Natural History on March 5, was called to order by the President at 8.15 p.m.

Forty-eight persons were present.

The minutes of the meeting of February 21 were adopted as read.

Seventeen persons were elected to Annual Membership: Dr. James Bonner, California Institute of Technology, Pasadena, Calif.; Dr. Hettie M. Chute, 70 Townsend Street, New Brunswick, N. J.; Miss Ruth Curtis, 613 South Braddock Avenue, Pittsburgh, Penn.; Mr. Delzie Demaree, Arkansas A. & M. College, Monticello, Ark.; Dr. G. W. Goldsmith, Box 1611, University Station, Austin, Texas; Mr. Robert L. Hulbary, Dept. of Botany, Columbia University, New York; Rev. George M. Link, Grafton, Ill.; Dr. Blanche McAvoy, 108 West Ash Street, Normal, Ill.; Mr. Charles B. Reif, 319 West 50th Street, Minneapolis, Minn.; Dr. George Dewey Ruehle, Subtropical Experiment Station, Homestead, Fla.; Dr. William Seifriz, Dept. of Botany, University of Pennsylvania, Philadelphia, Penn.; Dr. Forrest Shreve, Box 471, Tucson, Ariz.; Dr. G. Ledyard Stebbins, Jr., 314 Hilgard Hall, University of California, Berkeley, Calif.; Dr. H. E. Warmke, Dept. of Genetics, Carnegie Institution, Cold Spring Harbor, N. Y.; Mr. Henry F. Westheimer, R. F. D. No. 1, Springdale, Conn.; Dr. Roy M. Whelden, New Durham, N. H., and Mrs. Martha S. Wood [Mrs. L. Hollingsworth Wood], "Braewold," Mount Kisco, N. Y.

Three persons were elected to Associate Membership: Miss Helen M. Fraser, 51 South Maple Avenue, Ridgewood, N. J.; Mrs. Richard M. Lawton, 1215 Prospect Avenue, Plainfield, N. J., and Mr. M. D. Mann, Jr., 625 Locust Street, Roselle, N. J.

The resignation of Mrs. Howard S. Kaltenborn, R. F. D. No. 2, Ruston, Louisiana, was noted with regret.

Dr. W. S. Thomas, who was appointed to represent the Torrey Club at the New York-New Jersey Trail Conference, reported that

the southern gateway to the Hudson Highlands will be saved from further destruction and that the required funds for the purchase of the land known as Anthony's Nose are available.

Dr. Harold N. Moldenke of the New York Botanical Garden staff, delivered the popular lecture of the evening. The speaker's abstract of "A Naturalist in Florida" follows:

"In the southeastern United States there are some 5600 species of wild flowering plants, or one-third more than there are in the northeastern states (where there are only 3800). Of the total number in the Southeast, Florida has over 3600, or 65 percent, including 130 ferns and fern-allies, 81 orchids, and 50 epiphytes. It is a land of many waters—90 rivers, 110 large creeks, 200 lakes, 3,000,000 acres of everglades, and a coast line of 1,172 miles. Its largest lake, Lake Okeechobee, is the second largest fresh-water lake entirely within the U. S. A. Aquatic and marsh birds naturally abound, with 22 species of long-legged wading birds, including herons, ibis, egrets, storks, and bitterns in abundance. Endemic plant and animal species and varieties are numbered in the hundreds. A relative of the cultivated Boston fern is found in the rich hammocks with fronds seventeen to twenty-eight feet in length and an orchid with inflorescences seven to eight feet long, bearing up to a hundred flowers. Curious stream-lined water-turkeys swim under water with sufficient speed to overtake fish, and 3 species of scavanger birds vie with each other in disposing of dead animal remains. Among the distinctive ecological formations, each with its distinct varieties of plants and animals, are the coastal dunes, the pinelands, the hammocks, the everglades, the prairies, the costal mangrove lagoons, and the cypress-heads. Sloughs often protect the rich hammocks from the devastating everglade fires. Streams are often completely obscured by masses of floating water-hyacinths or water-lettuce. Wild-cats and panthers inhabit the more remote hammocks, alligators may still be found, and among the serpents are the water-moccasin, diamond-back and pygmy rattlesnakes, gopher-snake, and coral snake. Discovered first by Escalente de Fontanada in 1530, the everglades were called the Laguna del Espirito Santo, and the islands in them (everglade keys) the Cayos del Espirito Santo. In the winter the everglades may be dry, except for the natural streams and artificial canals which run through them, or covered with only a foot or two of water, but in the summer they are flooded, chiefly from underground streams which break up through the thin overlying rock strata in thousands of places, to a depth of ten or twelve feet. The region is unique and fascinating, a veritable treasure-house for the naturalist, and one which should by all means be preserved intact for posterity. It is urged that all friends of the great out-of-doors unite with naturalists and conservationists in backing the proposed Everglades National Park and in insuring its permanent maintenance."

The meeting adjourned at 9.45 p.m.

Clyde Chandler
Recording Secretary

Additional Field Trip for the Club

By invitation of John Scheepers, Inc., members of the Torrey Botanical Club are invited to visit the display and experimental gardens at the Scheepers' Estate, "Paradou," on Saturday, June 15, when Irises and Peonies will be the feature display. There will be a conducted tour with a talk by the Holland Hostess and a visit to the garden mart. Assemble at "Paradou" at 1.30 p.m.

Paradou is at Brookville, Long Island. Take N.Y. Route 25A, Northern Boulevard.

Corrections: In the March-April number, on page 58, in the report of the scientific program the name of Dr. R. Bloch was misspelled.

On page 59, paragraph 3, line 7, casual should read causal.

In the same number in the article on Pronouncing Lichen Names on page 41, *gracilis* and *gracilescens* should be printed phonetically (grăs'i-lis) and (grăs-i-les'ens), not with the long ā, also saepincola and caespiticia are mispelled.

NEWS NOTES

Poisonous Plants. A pretentious project is under way with chemists, pharmacologists, toxicologists, medical men and botanists in many institutions and countries cooperating, in which all plants reported to be poisonous to men or animals are to be studied. Dr. Harold Moldenke of the New York Botanical Garden is covering the northeastern United States. Members of the Club can cooperate by collecting plants supposed to be poisonous. The collections should include a good specimen in flower properly pressed with data as to time and place collected, also about one pound of the plant material sun dried. Care to be taken that the drying material does not mould and that no impurities are included.

Gray Herbarium. In the annual report of the herbarium by Dr. M. L. Fernald it is stated that more than 39,000 mounted specimens were added to the herbarium in 1939, bringing the collection of flowering plants and ferns to 1,033,850 sheets.

Southern Appalachian Botanical Club. Dr. H. L. Blomquist, of the department of botany of Duke University, was elected president; Wilbert Frye, of Pleasant Dale, W. Va., vice-president; Dr. Rogers McVaugh, the National Arboretum, Washington, secretary; and Dr. Nelle Ammons, department of botany, West Virginia University, treasurer. The Club publishes Castanea, edited by Dr. Earl L. Core, West Virginia University.

Prof. Harley H. Bartlett, chairman of the department of botany of the University of North Carolina, has been granted leave of absence from June to late September to assist in a study of malaria at the Gorgas Memorial Hospital in Panama.

Dr. Rodney H. True, professor emeritus of botany of the University of Pennsylvania, died in Philadelphia on April 8. He was seventy-three years old. He was a graduate of the University of Wisconsin, received the degree of Ph.D. from Leipzig University in 1895. He was professor of botany at the University of Wisconsin till 1900, plant physiologist in the United States Department of Agriculture from 1901 to 1920, professor of botany at the University of Pennsylvania from 1920 till his retirement as professor emeritus in 1937.

Garden Book Prize. The Macmillan Company offer a prize of $1,000 for the best garden book manuscript by an author who has not published a garden book previously. The competition closes November 30, 1940. Conditions of the contest can be secured from Prize Garden Book Competition, The Macmillan Company, 60 Fifth Ave., New York.

Huntington College Botanical Garden. The annual report of the garden lists 643 labeled species of trees, shrubs and herbaceous plants growing in the garden. Since the garden was established four years ago the number of plants, practically all natives of Indiana and adjacent states, has steadily increased. Of special interest in the report are the notes on the behavior of twenty-six plants moved to habitats entirely different from the original ones, that have survived for at least three or four years. Among these are the following plants taken from swamps or bogs and planted in comparatively dry upland soil: *Cicuta maculata, Acorus Calamus, Sium cicutifolium, Polygonum Muhlenbergii, Saurus cernuus,*

Decodon verticillatus, Ilex verticillata, Solidago patula, Cephalanthus occidentalis, Symplocarpus foetidus, Vaccinum Oxycoccus, and Caltha palustris.

The New York Bird and Tree Club in cooperation with the New York Botanical Garden had an all-day session at the Garden on May 9. As part of the program a bronze plaque in memory of Elizabeth Gertrude Knight Britton was unveiled in the wild flower section of the Thompson Memorial Rock Garden. At the same time the club turned over to the Garden a sum of money to be known as the Elizabeth Britton Fund for the study and protection of wild flowers. Mrs. Britton, wife of Dr. Nathaniel Lord Britton, was a pioneer in the movement for the protection of native wild flowers.

Dr. William J. Robbins, director of the New York Botanical Garden, was elected a member of the National Academy of Sciences at the meeting held in Washington the end of April.

A dinner in honor of Dr. Raymond J. Pool was given at the Student Union of the University of Nebraska in recognition of the completion of twenty-five years as chairman of the department of botany. At the conclusion of the dinner Dr. Pool was presented with a bound volume of letters of congratulation from former students and professional friends.

At the University of Iowa Professor Robert B. Wylie, due to age regulations, has retired as chairman of the department of botany, but will continue as professor of plant morphology. Professor Walter F. Loehwing succeeds him as chairman.

Dr. Albert C. Smith, associate curator of the New York Botanical Garden, will leave on October 1 to become curator of the herbarium at the Arnold Arboretum, Harvard University, succeeding Dr. Alfred Rehder who will retire because of the compulsory age limit.

North American Sedges. The New York Botanical Garden has published in two large volumes North American Cariceae by Kenneth K. Mackenzie. There are 539 plates of species of Carex and related genera, all prepared under the direction of Mr. Mackenzie. Mr. Mackenzie, a lawyer in New York City and a mem-

ber of the Torrey Club for many years, was the country's foremost authority on sedges. When he died in 1934 he left the Garden his herbarium of some 40,000 sheets, and the drawings and manuscript for this work which has been edited by Dr. H. W. Rickett. The two volumes are sold at cost price, $15.50 unbound and $17.50 in library buckram.

Fossil Plants. At Princeton University a card catalogue with illustrations of all described plant species of the Mesozoic and paleocene of North America has been compiled under the direction of Dr. Erling Dorf (who led the field trip of the Club reported on page 90 of this issue). With the catalogue is an artificial key to groups and genera. The catalogue may be consulted in the department of geology at Princeton.

The Pacific Division of the Botanical Society of America will meet with the A. A. A. S. at the summer meeting in Seattle, Washington, from June 17 to 22. There will be symposia on Aquatic Botany and on Recent Investigations of the Characteristics of the Photosynthetic Process as well as sessions for the reading of other papers.

At the 8th American Science Congress held in Washington, D. C., from May 10 to 20 papers were presented by a number of the members of the Torrey Club, among them Dr. Albert F. Blakeslee, Dr. Bernard O. Dodge, Dr. Wendell H. Camp, Dr. Albert C. Smith, Dr. William J. Robbins and Dr. Henry K. Svenson.

W.P.A. exhibit. During the week of May 20-25 the Professional and Service personnel of the Work Project Administration held an exhibit in the museum building of the New York Botanic Garden, of the work being done there. The exhibit included paintings of varieties of seedless grapes, hybrids of day lilies, and insect and fungus pests; specimens showing the steps followed in mounting over 200,000 herbarium sheets; volumes of prints and the card catalogue indexing the photographic collections of the Garden; and other types of work. At present 75 workers make up the personnel of the project.

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Of former volumes, 24–66 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

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Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

Volume 19, no. 1, 92 pages, 1937, price $1.50. Volume 19, no. 2, 178 pages, 1938, price $2.00.

(3) INDEX TO AMERICAN BOTANICAL LITERATURE

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Volume 40 July-August, 1940 Number 4

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A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

Vol. 40 July-August, 1940 No. 4

Report of the Local Flora Committee

I. Lespedeza

The present article on *Lespedeza* constitutes one of a series of notes on the distribution of native plants of the Torrey Club area, representing in part the work of the Local Flora Committee during the past two seasons. Two plates drawn by Miss Maud H. Purdy of the Brooklyn Botanic Garden illustrate species of *Lespedeza* found in our area. It must not be taken for granted that the problems are now cleared up; on the contrary, these drawings and distributional notes should be an incentive to much-needed observation in the field of variation in this difficult genus. Maps[1] showing the geographical distribution of individual species within the Torrey Club area as represented in the local herbaria of the New York Botanical Garden and the Brooklyn Botanic Garden have been placed in the herbarium of the New York Botanical Garden. For statements in the text the chairman of the committee is entirely responsible.

Lespedeza repens (L.) Bart. Pl. I, fig. 4. A southern species apparently common in southern New Jersey north to Morris County. Abundant on Long Island, especially south of the moraine, and extending northward in the Hudson Valley to Iona Island (*M. O. Steele*). Known from New Haven, Trumbull, and Fairfield, Conn. (See Conn. State Geol. & Nat. Hist. Surv. Bull. 48: 59. 1930.)

L. procumbens Michx. Pl. I, fig. 5. Occasional in southern New Jersey in the pine barrens and represented northward to central New Jersey (Somerset and Essex Counties), with a single station in Sussex Co. (Andover Junction). Common on Long Island and extending northward in the Hudson Valley to West Park, Ulster County, N. Y. Differs from *L. repens* only in the hairy stem, and therefore perhaps not a sufficiently distinct species.

[1] The following members of the committee have made maps of *Lespedeza:* Miss Hester M. Rusk, Miss Eleanor Friend, Miss Dolores Fay, Miss Ora B. Smith, Mr. J. Harry Logan, and Dr. H. A. Gleason.

L. VIOLACEA (L.) Pers. Pl. I, fig. 2. A large-flowered species represented in New Jersey from Warren, Morris, and Bergen Counties. It also occurs in southern Long Island and extends locally northward to Orange County and southern Ulster County (Ulsterville). The species was originally described (Sp. Pl. 2: 749. 1753) as having violet flowers in pairs, the leaves ovate, and the acute glabrous fruit three times as long as the calyx. Schindler (in Engler's Bot. Jahrb. 49: 593. 1913) has noted especially the long-exserted keel as characterizing the species.

L. BRITTONII Bickn. Pl. I, fig. 3. The TYPE, from Bronxville, N. Y., is illustrated. Bicknell thought it intermediate in character between *L. Nuttallii* and *L. procumbens,* but larger than either. It is of infrequent occurrence, being cited by Bicknell from Boston, Bronxville, N. Y., and Quaker Bridge in the New Jersey pine barrens. Members of the committee have seen on an open hillside in Orange County, N. Y., a single clump of *L. Brittonii* surrounded by abundant *L. intermedia* and *L. capitata,* and have wondered whether it might represent a hybrid between those two species.

L. NUTTALLII Darlington. Pl. I, fig. 1. The drawing illustrates a plant similar to Nuttall's specimen at the Philadelphia Academy of Natural Sciences, which came from Delaware and in which the broadly ovate leaflets are markedly retuse and of variable size. But Darlington's description evidently includes plants of some diversity. Herbaria include under *L. Nuttallii* all specimens of this group with leaves velvety pubescent below and with elongate peduncles. Dr. Britton (Trans. N. Y. Acad. Sci. 12: 61. 1892) felt that *L. Nuttallii* was quite distinct from *L. Stuevei* in "being much less pubescent, having slender-peduncled heads of flowers, much longer calyx-lobes, and longer, strongly acuminate pods." By Taylor the species is stated as extending up the Hudson Valley to the Highlands.

L. STUEVEI Nutt. Pl. II, fig. 1. Described from sandy fields in New Jersey, possibly from the vicinity of Bremen, where Dr. Stueve lived. The illustration is from a specimen close in appearance to Nuttall's type. Nuttall described the plant as velvety throughout, leaves elliptic-oval and obtuse, and the peduncles about an inch long, scarcely longer than the leaves. The distribution is scattered and not well understood, but the plant is, with us, primarily of the coastal plain. Forma *angustifolia* (Britton) Hopkins, Rhodora 37: 265. 1935, came, without assigned type, from

EXPLANATION OF PLATE I

Fig. 1. Lespedeza Nuttallii, Baldwin, L. I., *E. E. Powers*, 1892.

Fig. 2. L. violacea, Little Falls, D. C., *D. LeRoy Topping*, 1896.

Fig. 3. L. Brittonii, Bronxville, N. Y., *Bicknell*, TYPE.

Fig. 4. L. repens, Arlington, Va., *F. Blanchard*, 1890.

Fig. 5. L. procumbens, Dingmans Ferry, Pa., *Seelman*, 1899.

Habit drawings × ½; fruit × 3½.

the New Jersey pine barrens. According to Hopkins (l.c.) the only difference between this and the typical form is in the shape of the leaflets, linear or linear-oblong instead of elliptic to oval. *L. Stuevei neglecta* Britton is a superfluous name based on *L. Stuevei* var. *angustifolia.*

L. INTERMEDIA (Wats.) Britton (*L. frutescens* of manuals). Pl. II, fig. 3. *L. virginica* and *L. intermedia* are "very closely related . . . . and may advantageously be retained as species. *L. 'frutescens'* is a more freely and loosely branched plant, with less leafy stems and broader oval or oblong-oval rather than linear or linear-elliptic leaflets." Blake, Rhodora 26: 30. 1924. Generally distributed throughout, but no specimens are represented from Columbia, Dutchess, or Putnam Counties, or from Warren, Morris, and Hunterdon Counties in New Jersey.

L. VIRGINICA (L.) Britton. Pl. II, fig. 2. Abundantly represented from Long Island and from New Jersey. North of Westchester County in New York only from Iona Island in the Hudson near Bear Mountain, and from two stations in Orange County. Forma *Deamii* Hopkins, Rhodora 37: 265. 1935, a western form in which the stem-pubescence is spreading, is reported from New Haven, Conn. (l.c.).

L. SIMULATA Mackenzie & Bush. This western species, with calyx-lobes 6–8 mm. long (two-thirds as long as the pods) and said to resemble *L. capitata,* has been reported from a few places in Connecticut and from Haworth, Bergen County, New Jersey. According to Palmer & Steyermark, Ann. Missouri Bot. Gard. 22: 582. 1935, it is "Probably a hybrid between *L. virginica* or *L. Stuevei* and *L. capitata.*"

L. HIRTA (L.) Elliott. Pl. II, fig. 5. Leaflets described by Linnaeus as oval. Probably throughout the area, but no specimens from Sullivan, Greene, Delaware, Dutchess, or Putnam Counties. Var. *oblongifolia* Britton "may be a hybrid with *L. angustifolia*"; the TYPE came from Egg Harbor City, N. J.

L. CAPITATA Michx. Pl. II, fig. 4. Common throughout the area, the typical form having oblong leaflets. Includes *L. velutina* Bickn., and similar variants which have been placed under *L. capitata* by Fassett in "The Leguminous Plants of Wisconsin," 1939, a treatment coinciding with the independent observation of the Local Flora Committee.

HENRY K. SVENSON, Chairman
Local Flora Committee

EXPLANATION OF PLATE II

Fig. 1. Lespedeza Stuevei, Merrick, L. I., *Wm. Ferguson*, 1918.

Fig. 2. L. virginica, Terra Cotta, D. C., *D. LeRoy Topping*, 1896.

Fig. 3. L. intermedia, Cascadilla Gorge, N. Y. *Muenscher & Bechtel no. 480.*

Fig. 4. L. capitata, Franklin Furnace, N. J., *Van Sickle*, 1895.

Fig. 5. L. hirta, Addison, N. Y., *B. B. Stroud*, 1899.

Fig. 6. L. angustifolia, Landisville, N. J., *C. A. Gross*, 1887.

Habit drawings × ½; fruit × 1 and × 3½.

Guide to the Lichens of the New York Area—Part 7

G. G. Nearing

Group 8. The Blister Lichens. Papery Lichens of small size growing in rosette form with narrow branches and lobes, the parts of a few species puffed or swollen. Color varies from gray to brown, greenish and white. Fruits black, gray or dark brown, often frosted with gray or white; dull, not shining. Spores 2-celled, brown or blackish.

Physcia. All the species in Group 8 belong in the genus Physcia, which here includes Anaptychia and Pyxine, as the differences on which these two genera are founded seem unimportant. Blister Lichens resemble the smaller Shield Lichens (Cetraria and Parmelia) of Group 5, from which they can usually be distinguished—easily by microscopic examination of the spores, those of Physcia being dark colored when mature and plainly 2-celled, while the Shield Lichens have colorless, undivided spores. Under the hand lens the fruits of Physcia are dull, while those of most of the Shield Lichens are somewhat shiny. The frosted or pruinose appearance often seen on the fruit disks of Physcia is absent from the Shield Lichens. Physcia fruits are usually black, slate-gray or blackish brown, in contrast with the chestnut-brown, yellow-brown, greenish, or rarely yellowish gray which prevail among the Shield Lichens. The upper surface of the lobes and branches of Physcia is dull, often powdery, and without any yellowish tint, though the interior may be yellow. Shield Lichens on the other hand have usually a somewhat shiny surface, especially on the tips, and many are distinctly yellowish. These characters, taken together enable the lichenist to separate the two important groups in the field. Algal cells Protococcus.

(Three more or less upright species of Physcia will be found with the Stalked Lichens in Group 4.)

Physcia sorediata. Spotted Blister Lichen

Also called *Pyxine sorediata.* Found throughout the New York area rather plentifully on tree bark, occasionally on rocks. It forms rosettes up to 6 or 8 cm. across, which cling closely and cover their area completely, leaving no considerable spaces between the parts,

but with hardly any overlapping. Branches and lobes are usually 1 to 2 mm. wide, with margins crowded upward where they meet, and breaking into mounds of whitish or blue-gray soredia up to 1 mm. or more in diameter. These in contrast to the brownish gray or purplish gray upper surface, which is often rather dark, give a conspicuously spotted appearance. The rounded tips are usually depressed and somewhat saucer-shaped. The under surface is pale at the tips, becoming black, with many similarly colored, sometimes branched holdfasts usually shorter than 1 mm. The interior, seen by scraping off the upper surface, is a dull yellow pith, not white as in most Papery Lichens.

Fruits rare, up to 1.5 mm. in diameter, black or frosted white, with a thin, blackening rim. Spores 2-celled, brown, 17 to 28 by 6 to 10 microns.

As *Physcia sorediata* rarely fruits in this region, all the characters noted above should be studied. The peculiar pattern made by the touching margins and close-clinging, depressed tips, with the uniformly dusky color, spotted by soredia, give an appearance which, once well learned, is easily recognized, but a beginner must compare this with *Parmelia tiliacea* (Group 6), *Cetraria placorodia* (Group 5), and *Physcia stellaris,* none of which have soredia, and with *Physcia speciosa, P. astroidea, P. caesia* and *P. obscura*, all of which, though bearing soredia, have more space between the parts. These other lichens all have white pith, and from them the yellowish pith of *P. sorediata* is sufficient distinction where it can be seen, requiring only a good lens and a little careful scraping with the knife or fingernail. It must not be confused with the orange-buff pith of *P. endococcinea,* which is visible from beneath the lichen, or with the bright blood-orange pith of *P. endochrysea.* The closely related *P. Frostii* is smaller, paler, white within, and found only on rocks.

Physcia Frostii. Frost's Blister Lichen

Also called *Pyxine Frostii.* Found on granite, shale and sandstone, usually on a vertical face of the rock, in shade. Uncommon. It forms very flat, close-clinging rosettes up to 3 cm. across, with parts usually about 0.5 mm. wide. The aspect resembles a smaller *P. sorediata,* but the color is pale gray with cream-color tips. The parts also, instead of flattened, tend to be convex, and their margins

cling to the rock instead of being crowded upward. The mounds of powdery soredia, less than 0.5 mm. across, are centered on the branches rather than on their margins. In some cases there are spaces between the parts. The pith is white, not yellow.

Fruits very rare, up to 0.8 mm. in diameter, black. Spores brown, 2-celled, 14 to 20 by 5 to 7 microns.

Physcia Frostii, one of the smallest of the Papery Lichens, suggests the intermediate forms in Group 14, verging on the Crust Lichens. It could be mistaken for the very common *Crocynia zonata* (Group 14), which has a darker, often blackish center, and two or three conspicuous zones of pale tips. *Lecanora muralis* (Group 14) is colored like *Physcia Frostii,* but has much shorter, broader lobes, with lifted margins, and bears many pale buff fruits. *P. tribacia* has lifted tips, white beneath, while the tips of *P. Frostii* cling closely, and are black beneath. *P. teretiuscula* is smaller, with even narrower and separated parts, tapering to pointed tips, and has minute soredia, while the soredia on *P. Frostii* are comparatively large heaps. *Rinodina oreina* (Group 14), though of like habit, and with similar spores, is much darker, distinctly greenish, without soredia, and with frequent blackish fruits.

Physcia speciosa. Plume Lichen

Also called *Anaptychia speciosa.* Frequent on tree bark and mossy ledges in open woods throughout the New York area. It forms rosettes up to 10 cm. and more across, made up of graceful branches with feathery divisions, the parts of rather uniform width, 1 mm. or more, the tips slightly lifted. The upper surface is greenish to ashy gray or almost white. The upward-curling margins break into pale blue or white, dusty soredia, which are often crescent-shape, accenting the pattern of the lobes. The under surface is white, with whitish holdfasts some of which might be considered marginal hairs, which spread as much as 2 mm., often plainly visible from above.

Fruits are rare, brown, cup-shaped, up to 7 mm. in diameter. Spores 2-celled, brown, 22 to 34 by 12 to 15 microns.

Though not often seen in fruit, *Physcia speciosa* will be recognized at once by its graceful branches edged with pale blue dust, and the spreading white hairs below. It is easily distinguished from

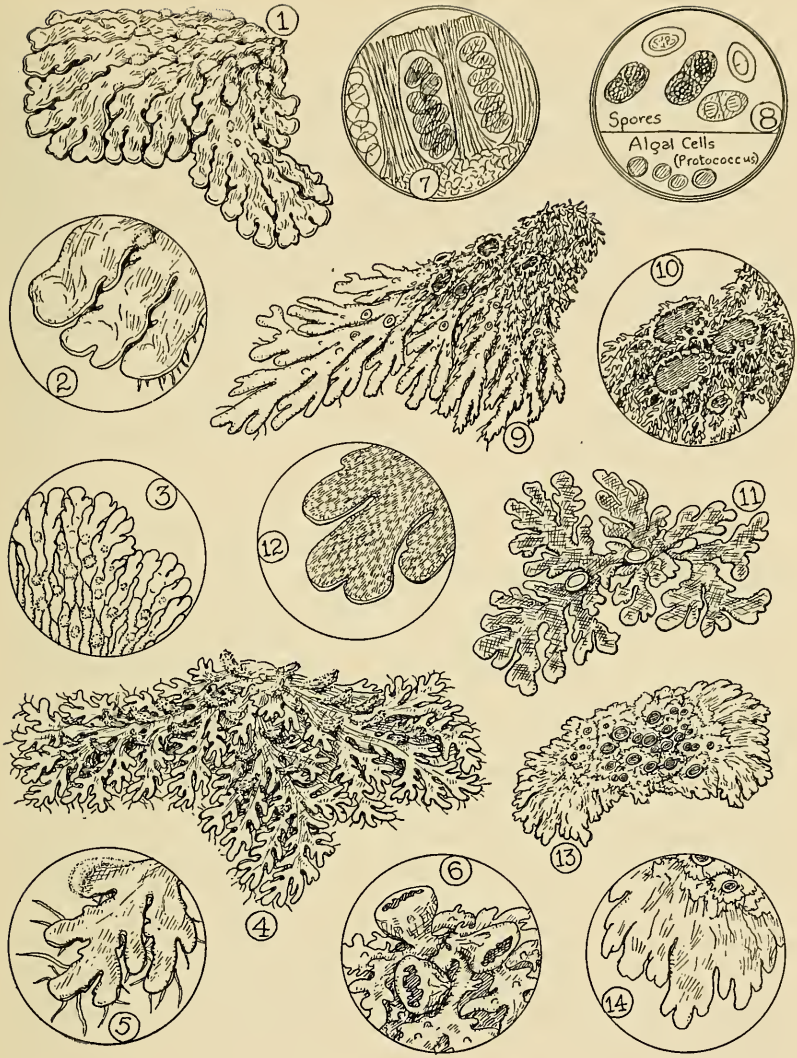

PLATE 11

Fig. 1. *Physcia sorediata,* gray or drab.
Fig. 2. *P. sorediata,* tips.
Fig. 3. *P. Frostii,* tips, pale gray to cream.
Fig. 4. *P. speciosa,* gray, with pale blue soredia.
Fig. 5. *P. speciosa,* tips and soredia.
Fig. 6. *P. hypoleuca,* fruits.
Fig. 7. *P. aquila,* spore layer.
Fig. 8. *P. aquila,* spores in various stages.
Fig. 9. *P. aquila,* brownish, when wet green.
Fig. 10. *P. aquila,* fruits.
Fig. 11. *P. pulverulenta,* brown with white particles.
Fig. 12. *P. pulverulenta,* tip.
Fig. 13. *P. adglutinata,* dull brown.
Fig. 14. *P. adglutinata,* tips.

the somewhat similar *Parmelia physodes* (Group 5), which has a black under surface, brown at the tips. *Cetraria placorodia* (Group 5), though whitish beneath, has no soredia, nor widely spreading hairs, while its upper surface glistens slightly. *Parmelia ambigua* is tinted with yellow and has a black under surface. *Physcia sorediata* differs in its darker color, dark under surface, and touching parts. *P. obscura* and *P. caesia* are dark beneath, with dark holdfasts. The only species of Physcia which requires study to distinguish from *P. speciosa* is its own subspecies *P. hypoleuca,* which has blackening holdfasts and a peculiar under surface, but is often otherwise similar. *P. astroidea,* a smaller lichen, has its soredia massed in the center.

Physcia hypoleuca. Fig Lichen

Also called *P. speciosa* var. *hypoleuca* or *Anaptychia hypoleuca.* Found on trees and sometimes on rocks, fairly frequent on limestone. The rosettes, up to 10 cm. across, with parts 3 or 4 mm. wide, have a rampant, lumpy habit, with long, gracefully curving branches, the tips somewhat lifted. Warts and tiny lobes occur scattered along the margins, or may cover most of the lichen. The upper surface is pale gray or whitish, the under surface very white or buff, with blackening holdfasts. A vertical section shows under the microscope that the normal lower layer of cells is missing near the tips, and the under surface is really exposed pith, with a marked silky appearance.

Fruits not common, often somewhat fig-shaped, the deeply concave spore surface dark brown, the thick, incurved rim often bordered with tiny lobes, which may radiate from it, or grow inward, partly hiding the disk. Spores 2-celled, blackish, 25 to 38 by 14 to 20 microns.

Physcia hypoleuca differs from *P. speciosa* in the less frequent marginal soredia, and the presence of tiny lobes and warts. Also the holdfasts turn dark. From this and other species which resemble it, the bare pith beneath the tips is sufficient distinction, but this character requires experience to detect. The presence of lobes on the fruit-rim is another unusual character, shared by *P. aquila* and *P. pulverulenta* in this group. *P. aquila* is typically brownish, turning green when moist, and the under surface and holdfasts are

usually pale brownish. *P. pulverulenta,* also brown, is dotted with white particles. *Parmelia frondifera* (Group 6), one of the few other lichens with lobed fruit-rims, has the upper surface somewhat shiny.

Physcia aquila. Shaggy Lichen

Also called *Anaptychia aquila.* Frequent on mossy rocks and tree-bases in deep woods throughout the New York area, especially in limestone districts. The irregular rosette masses grow as much as 10 cm. across, and often 5 mm. thick, with densely overlapping parts. The long, straight branches, 1 mm. or so wide, may be hidden under tiny lobes often only 0.1 mm. wide, which spring from any part of the lichen, and grow in various directions, but mostly downward, giving it a singular, shaggy, feathery appearance. In this condition, it may be called var. *detonsa.* The color is grayish to tawny brown when dry, pale yellowish brown in old herbarium specimens, moss-green when fresh and moist, the under surface pale brownish, rarely blackening, with usually pale holdfasts.

Fruits usually plentiful, up to 5 mm. in diameter, brown or blackening, with a thickish rim from which often spring prongs and lobes like those on other parts of the lichen. Spores 2-celled, brown or blackish, 28 to 43 by 16 to 25 microns.

Physcia aquila is easily recognized by the small lobes with which it is overgrown, and the brownish color. There is little need to distinguish the more densely clothed var. *detonsa,* as any degree of this development may be found on different parts of a single specimen. The presence of these small lobes on the fruit rims distinguishes it from all other species of Physcia except *P. hypoleuca,* pale gray, and *P. pulverulenta,* brown with white particles, neither turning particularly green when wet, while this color change is marked in *P. aquila.* A somewhat similar mass of small lobes is seen in *Pannaria microphylla* (Group 10), but in this the parts are smaller and shorter, growing usually close against a blue-black under-crust. *Parmelia frondifera* (Group 6) is paler and shining, with a black under surface.

Physcia pulverulenta. Mealy Blister Lichen

Found infrequently on mosses, trees or rocks, preferring limestone. It may form rosettes up to 8 or 10 cm. across, with parts 3

or 4 mm. wide, but is more likely to be met in a dwarfed or straggling state. The often short branches 1 or 2 mm. wide, may broaden abruptly to twice that width at the neatly rounded, often lifted tips. The upper surface is chestnut brown to pale purplish brown, but appears whitish because of the many white, mealy particles 0.01 or 0.02 mm. across, distributed rather regularly, and plainly visible under the lens. At times these particles appear only on small areas near the tips. At other times they whiten the entire lichen, so that the brown color can hardly be seen. Tiny whitish lobes and granules may cover the entire lichen, and there may be soredia. The under surface at the tips is whitish, elsewhere blackening, with black root-like holdfasts.

Fruits locally rare, up to 5 mm. across, brown or frosted white, with a rim which may be smooth, lumpy or lobed. Spores 2-celled, brown, 23 to 40 by 12 to 21 microns.

Physcia pulverulenta is marked from all other local Papery Lichens by the white particles on the brown upper surface. In specimens where the particles are few or lacking, the coloring is usually dark, but some at least of the tips whitish beneath, a rather unusual combination. The tiny lobes seen on some specimens are short and obtuse. No further comparisons are needed to determine the normal form, but sometimes the brown surface is very pale, nearly white, when it approaches *P. granulifera,* a species found further west. At first glance it might be mistaken for a form of *P. stellaris.*

Physcia adglutinata. Clinging Blister Lichen

Occurring in the New York area, but not common, and so inconspicuous that it escapes attention. It grows on tree-bark in rosettes commonly 2 or 3 cm. across, but inclined to fall away and disintegrate, or to remain so undeveloped as often to resemble a Crust Lichen, with no visible papery structure. The central parts are nearly always crust-like with tiny lobes 0.1 mm. across or narrower, barely emerging here and there, or merely etched on the crust, becoming evident where it cracks into irregular patches 1 to 2 mm. across, where they show on the free edges. Papery branches and lobes tissue-thin are seen at the edge of the rosette, glued tight against the bark, and vaguely dividing into parts about 1 mm.

across. The color is dull, grayish brown, with a pale under surface difficult to see.

Fruits usually present, up to 2 mm. in diameter, but usually smaller, blackish, with a thin, brown rim, somewhat notched. Spores 2-celled, brown, 13 to 22 by 7 to 10 microns.

Physcia adglutinata is more likely to be mistaken for one of the Crust Lichens than for any other Papery Lichen, but some trace of the papery lobing is always present to distinguish it from *Rinodina sophodes* (Group 20), which has similar spores. In well developed forms, the thinness of the tightly clinging tips separates it from all other species of Physcia. *P. stellaris* has usually a central crust, but its much thicker tips are pale gray, not brown. *P. obscura* and *P. endochrysea* have a dull drab shade, but their tips are loosely attached to the bark by many black holdfasts. *Parmelia olivacea* and its subspecies (Group 5) have brown, close-clinging lobes, and an often crust-like center, but their upper surface looks almost metallic, usually shining like bronze, while that of the Physcia is dull and delicate.

(*Group 8 to be continued in Part 8*)

Ridgewood, N. J.

The Geographic Distribution of Pilea fontana

F. J. Hermann

In 1913 Dr. J. Lunell, proposing *Adicea fontana* as distinct from the widespread *A. pumila* (L.) Raf., cited collections of his new species from Benson County, North Dakota only. Rydberg, having made the new combination for the plant necessitated by the conservation of the name *Pilea* (Brittonia 1:87. 1931), later defined its range as "N.D.-Nebr." (Flora of the Prairies and Plains of Central North America. 1932). He maintained as likewise distinct, however, another of Lunell's segregates from *Pilea pumila* (L.) Gray, namely *P. opaca* (Lunell) Rydb., but botanists of such extensive field experience as Professor M. L. Fernald and Mr. C. C. Deam have been unable to concur with Rydberg in his demarcation of *P. opaca* from *P. fontana. Pilea fontana,* in its consistently black achenes with prominent colorless margins (the achenes of *P. pumila* being uniformly green and marginless), its relatively small and short-petioled leaves with blades only 8- to 18-toothed and rounded or truncate at the base rather than cuneate, seems amply deserving of recognition, while *P. opaca* exhibits merely the unstable characteristics of an ecologic variant. If *P. opaca* is considered as synonymous with *P. fontana* the combined range of the two, according to Rydberg's account, will include Wisconsin.

Recently Professor Fernald has appreciably extended the range of *P. fontana* in delimiting it as "from North Dakota to Nebraska, extending eastward to western New York" (Rhodora 38:170. 1936). The range of the species may now be further extended from an examination of the North American *Pilea* collections in the herbarium of the New York Botanical Garden and in the U. S. National Herbarium, where typical material of *P. fontana* was found from as far east as Prince Edward Island, Long Island and northeastern New Jersey and from as far south as Florida.

The known stations for *Pilea fontana* are still very few in comparison with those of the ubiquitous *P. pumila,* yet it is clear that the former is by no means a species of limited distribution. More general discrimination between the two by local botanists will doubtless modify the present proportionate representation of these two clearweeds in herbaria. An observation upon the difference in

habitat preference between the two may be useful in distinguishing them in the field. Unlike *P. pumila,* which shows a partiality for moist, shaded woods and is not, as a rule, conspicuously gregarious, *P. fontana* is usually found in a boggy or marshy environment, frequently in the open where it may form extensive carpets simulating a mat of seedlings of the coarser *P. pumila.* The collections of *P. fontana* seen by the writer are cited below, in the interest of students of local floristics to whom its known range may be indicative of the possibility of detecting it in their areas.

Prince Edward Island: Larch swamp, Dundee, Kings Co., Aug. 26, 1912, *Fernald, Long and St. John,* no. 7324 (US). New York: Ithaca, Sept. 11, 1875, without collector (US); Bridgehampton, Long Island, Aug. 12, 1925, *W. C. Ferguson,* no. 4788 (NY). New Jersey: Wet woods in Eagle Rock, Essex Co., Oct. 1, 1905, *K. K. Mackenzie,* no. 1869 (NY); West Englewood, Bergen Co., Sept. 15, 1917, *P. Wilson* (NY). Virginia: Abundant in wet land, Glencarlyn, Arlington Co., Oct. 6, 1894, *L. H. Dewey,* no. 162 (US); wet swale west of Edinburgh near Columbia Furnace, Shenandoah Co., Aug. 14, 1938, *H. A. Allard,* no. 5459 (US); low ground near Jones Mill Pond, Williamsburg, James Co., Sept. 20, 1921, *E. J. Grimes,* no. 4409 (NY). Marsh near Longshol, Montgomery Co., June 23, 1940, *F. J. Hermann,* no. 10665 (US). Florida: Near Jacksonville, Duval Co., Oct. 29, 1894, *A. H. Curtis,* no. 5349 (NY; US). Ontario: Amherst Islands, Aug. 15, 1890, *J. Fowler* (US). Michigan: Open marshy bank of Huron River 2 miles east of Ann Arbor, Washtenaw Co., Sept. 22, 1935, *F. J. Hermann* no. 7341 (*Plantae Exsiccatae Grayanae,* no. 650) (NY; US); marshy border of lake, 2 miles west of Cambridge, Lenawee Co., Oct. 1, 1936, *F. J. Hermann,* no. 8408 (NY); marsh bordering stream, 1 mile east of Trist, Jackson Co., Sept. 18, 1937, *F. J. Hermann,* no. 9297 (NY). Indiana: Abundant in decadent tamarack bog, 5 miles east of Lagrange, Lagrange Co., Sept. 20, 1936, *C. C. Deam,* no. 57418 (US). Wisconsin: Green Bay, Brown Co., Sept. 17, 1891, *J. H. Schuette* (NY). Minnesota: Moist meadows, Winona, Winona Co., June 1886, *J. M. Holzinger* (NY; US); shore of Morrison Lake, Itasca Park, Clearwater Co., Sept. 6, 1929, *M. L. Grant,* no. 3285 (NY; US). North Dakota: In a thoroughly shaded cold bog along a rill, Pleasant Lake, Benson Co., Aug. 14, 1911, and July 3,

1912, *J. Lunell* (Cotype) (NY). Nebraska: On Middle Loup River, near Thedford, Thomas Co., Aug. 7, 1893, *P. A. Rydberg,* no. 1609 (NY); on South Fork of Dismal River, Aug. 12, 1893, *P. A. Rydberg,* no. 1609 [!] (US); on Middle Loup River, near Mullen, Hooker Co., Aug. 19, 1893, *P. A. Rydberg,* no. 1609 [!] (US); South Cody Lake, Sept. 19, 1915, *Ray Thomson* (US).

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Marine Flowering Plants

Harold N. Moldenke

It is, of course, well known that there are a great many genera and species of flowering plants which are not only able to live under very saline conditions along the sea-coasts of the earth and at the borders of salt lakes, but many which in fact thrive only in such situations and under such conditions and will not grow well, if at all, in any other habitat. Such plants are known as halophytes. Many scores of species of flowering plants grow regularly on land which is periodically inundated by rising tides of salt water (as, for example, *Eriocaulon parkeri*), while the value of mangroves (*Avicennia, Rhizophora, Laguncularia*) in extending the margin of land into the sea in the famous mangrove-lagoons of tropical regions is well known.

These plants, however, are all fundamentally terrestrial plants. It is not so well known by the general public or even by botanical students that a considerable number of genera and species of flowering plants actually are able and do live all of their lives in the sea, completely submerged at all times by the water of the earth's oceans, in company with the many thousands of microscopic and macroscopic species of blue-green, green, red, and brown algae, which are the true "seaweeds" as we usually think of them and which are flowerless and much more primitive types of plant life. The marine flowering plants often grow in colonies fully as extensive as those of some marine algae and are, in fact, often mistaken

for algae. However, they bear flowers essentially like those of all terrestrial flowering plants and produce seeds as do all phanerogams. They are true flowering plants which have merely become adapted to a marine existence.

A very cursory examination of literature reveals at least ten genera of these marine phanerogams and almost fifty species. These genera represent five different families of as many orders of primitive phanerogams: *Cymodoceaceae* [*Najadales*], *Ruppiaceae* [*Potamogetonales*], *Zosteraceae* [*Aponogetonales*], *Posidoniaceae* [*Juncaginales*], and *Hydrocharitaceae* [*Butomales*]. A more intensive search of the literature would doubtless reveal more species and a thorough search of the sea-coasts of the earth would probably bring to light many as yet undiscovered and undescribed forms.

Probably the most famous of these marine flowering plants is *Zostera marina,* known popularly as "sea-wrack", "grass-wrack", and "eel-grass". This inhabits the coastal waters of Europe, Asia Minor, North America, and eastern Asia. It grows wholly under water, its long jointed stems rooting at the nodes and creeping along in the sand or mud of the ocean floor, sending up erect slender branches, which produce long and narrow, alternate, grass-like, ribbon-shaped leaves. The flowers are unisexual, naked, sessile, and hidden in a sheath. It is gathered in great quantities along with marine algae for manure. When dried it is extensively used for packing and by upholsterers under the name of "alva marina". Another species, *Z. nana,* inhabits the North Sea, Caspian Sea, Black Sea, Mediterranean, and the water around the Canary Islands. Other species inhabiting European waters are *Z. hornemanni* and *Z. dubia,* while off the coasts of Japan is found *Z. japonica,* in the Tasman Sea and Antarctic Ocean about Australia is found *Z. tasmanica,* and off the coasts of western North America *Z. pacifica.*

An interesting feature of the eel-grass is that it seems periodically to be attacked by some micro-organism which spreads with almost unbelievable rapidity and wreaks great destruction to the plants not only on one coast, but often throughout its distribution. Sometimes the attacks are local and then may in part be due to sudden changes in the salinity of the water or some other feature of the environment, but the literature is filled with references to periods when the plant was singularly scarce. At least twice in recorded history this scarcity was world-wide. The first of these

epidemics occurred in 1893-1894 and the second began in late 1929, reached its peak in 1931-1932, and persisted through to 1935 and later. C. Cottam in Rhodora 36: 261 and 37: 269 *et seq.*, has given graphic descriptions of these periods of scarcity and epidemic. The 1929-1935 epidemic is thought to have been caused by a protozoon of the genus *Labyrinthula*. Cottam reports that at about midsummer in 1931 in most localities from New England to North Carolina the leaves of the eel-grass became somewhat darkened, broke from the stems of the plant, and washed ashore in great windrows. Before the summer was over less than one percent of a normal stand persisted in most affected areas. The Canadian coast south of the Gulf of St. Lawrence was denuded by the fall of 1932 and when ice cleared away in the spring of 1933 practically the entire area of the plant's regular range in that region was 99 percent destroyed. Since 1935 the plant has slowly been making a comeback into the areas which it formerly inhabited, much to the relief of lovers of our wild fowl, for it is a favorite food of plant-eating water fowl.

In the waters adjacent to Florida and Louisiana and from there southward in the Gulf of Mexico and the Caribbean Sea and in the waters of tropical South America is found *Thalassia testudinum*, known popularly as "turtle-grass" or "sea-weed". Dr. J. K. Small has written [Man. SE. Fl. 29. 1933] that this plant "occurs mainly in vast submarine fields, often forming a dense turf. The leaves are washed ashore in vast quantities and are gathered as 'seaweed' for fertilizer. Only during quiet weather, and consequently clear water, can one get an adequate view of these submarine fields, which are favorite rendevous for various kinds of fish, turtles, and other marine animals". Two other species, *T. hemprichii* and *T. indica*, inhabit the waters of the Pacific and Indian Oceans in the general region of tropical Asia.

The genus *Ruppia* inhabits salt and brackish water along seacoasts and also the ocean floor in quiet bays, coves, and rivermouths. Its commonest representative is *R. maritima*, known commonly as "ditch-grass", "tassel-pondweed", or "sea-grass", and found throughout the temperate and tropical portions of the earth in favorable situations. Other species include *R. rostellata* in the seas of Europe and tropical Asia, *R. intermedia* in Scandinavian waters, *R. zosteroides* originally found off Sicily, but probably

occurring throughout the Mediterranean region, *T. taquetii* in Korean waters and the China Sea, *R. obtusa* and *R. filifolia* in the waters adjacent to Patagonia, *R. anomala* in the Caribbean, *R. cirrhosa* in Italian waters, and *R. occidentalis, R. curvicarpa,* and *R. pectinata* in the waters of the Pacific along the shores of western North America. Some of the species of this genus are able to grow also in fresh water and may ascend rivers far beyond the area of tidal influence. On the western coast of North America. is also the strange genus *Phyllospadix* with two known species: *P. scouleri* ranging from Vancouver Island and British Columbia south to Santa Barbara and other parts of California, and *P. torreyi,* known only from Californian waters. The latter is used extensively as fireproofing and deadening in filling between the walls of buildings. A peculiar monotypic genus is the genus *Enalus,* represented by *E. acoroides* in the waters of the Indian and western Pacific Oceans.

In the Mediterranean Sea and the waters adjacent to the Iberian Peninsula is found *Posidonia oceanica.* The only other known species of this genus, *P. australis,* inhabits the waters of extra-tropical Australia, Tasman Sea, and the Antarctic Ocean. The genus *Halophila* is widely distributed: *H. ovalis* in the Indian Ocean and South Seas, *H. stipulacea* and *H. beccarii* in the Indian Ocean and other waters adjacent to tropical Asia, *H. spinulosa* in the Japan Sea, Yellow Sea, and China Seas, through the South Seas, to the Coral Sea off northern Australia, and *H. baillonis* in the Caribbean.

The genus *Halodule* [*Diplanthera*] is known from three species: *H. wrightii* inhabits the waters of the Gulf of Mexico and Caribbean Sea, *H. australis* the Red Sea, and *H. uninervis* the Indo-Pacific Oceans. The genus *Amphibolis* is also represented by three species: *A. ciliata* in the waters of the Indo-Pacific Oceans and *A. bicornis* and *A. antarctica* in the Antarctic Ocean and Tasman Sea adjacent to Australia.

Probably the largest genus of marine phanerogams is the genus *Cymodocea.* One species, *C. manatorum,* known as "manatee-grass", inhabits the waters of the Gulf of Mexico and Caribbean Sea and may be looked for off the coasts of the southern United States and the West Indies. It is entirely marine and is seldom seen except when dredged up during dredging operations in bays or harbors or when washed ashore after storms. It is said to be a

favorite of the manatee or sea-cow. Other species of this widespread genus include *C. aequorea* in the Mediterranean, *C. rotundata* in the Red Sea, *C. preauxiana* and *C. webbiana* in the waters adjoining the Canary Islands, *C. griffithii* in the Antarctic off southern Australia, *C. angustata* in the southern Indian Ocean off the coasts of western Australia, *C. isoëtifolia* in the waters of the Indo-Pacific Oceans, *C. australis* in the Bay of Bengal, *C. asiatica* in the East China Sea around the Liu-kiu Islands, *C. acaulis* off the coasts of eastern Africa, *C. nodosa* in the Mediterranean, the waters adjacent to the Iberian Peninsula, and those off the coasts of northern and western Africa, and *C. serrulata* widely distributed in tropical seas.

The New York Botanical Garden.

BOOK REVIEWS

A Manual of Aquatic Plants*

George T. Hastings

Water plants are notoriously difficult to determine by the vegetative characters. Botanists in the Torrey Club range find the Key to Submerged and Surface-Floating Aquatics published by Miss Mary Barrett in the pamphlet Three Keys to Wild Flowering Plants helpful, but its range is very limited and the plants included are only those indicated by the title. Dr. Fassett has written a complete manual of the aquatic plants of the United States from Minnesota and Missouri east to the Gulf of St. Lawrence and Virginia. An aquatic is described as a plant that "may under normal conditions germinate and grow with at least its base in the water." For some reason bog and salt marsh plants are not included in the book. The general key in the first part of the book and the keys to species in the second part are based chiefly on vegetative characters. With the general key are sixteen plates to illustrate the terms used and the habits of the plants of each family. The descriptive treatment, besides keys to the species, has brief descriptions of each species and, with few exceptions, illustrations to show the whole plant with enlarged details where they help in identification. Fully half of the

* A Manual of Aquatic Plants. Norman Fassett. McGraw-Hill Book Co. 1940. vii+382 pages. $4.00.

book consists of the full page plates of excellent line drawings. For Potamogeton there are fourteen plates illustrating thirty-three species and thirteen varieties or forms. In the case of the willows, where sixteen species are described, together with several varieties and forms, there are keys accompanied by illustrations to plants with mature leaves, to staminate plants and to pistillate plants in blossom. Other genera are treated as fully.

Scientific names used follow the International Code of Botanical Nomenclature. If the name used differs from that used in Gray's Manual or in Britton and Brown's Flora the name used in these works appears as a synonym, followed by G. or B.

If any adverse criticism were to be made of this book it would probably be of some of the species included or still more probably of species omitted. For example many botanists would not consider some of the willows as aquatics and the same would apply to many of the grasses and some at least of the twelve species of Bidens and nine of Aster. On the other hand the river birch (*Betula nigra*) would seem to deserve a place and certainly as long as any ferns are given the Virginia chain, marsh, and sensitive should be included. But Dr. Fassett anticipated this criticism: "The author is certain that no two individuals would make the same list of species; it is probable that the same individual would not make identical lists at different times." Because of this uncertainty as to the right of some plants to be considered aquatics the author has evidently included many that he considered doubtful.

The keys have been tested out for several years in Dr. Fassett's classes and proved easy to use. The book will be helpful to everyone who collects plants in ponds, lakes or marshes and along streams. The illustrations are attractive and add immeasurably to the usefulness of the book.

The Structure of Economic Plants*

R. C. Benedict

Although somewhat belated, it is worthwhile to publish a review of Hayward's "The Structure of Economic Plants." The text is

* The Structure of Economic Plants. H. E. Hayward. The Macmillan Co. 1938. 674 pages, 340 figures. $4.90.

designed to serve as a text in plant anatomy. With this purpose, the author has covered the subject in two parts: Part 1, General Anatomy; Part 2, Economic Plants.

The first part serves as an excellent survey of the general field of the anatomy of higher vascular plants. Here the author has outlined and illustrated the whole field as he sees it with particular attention to definitions and clarification of terms. The second part consists of sixteen chapters, each concerned with the detailed description of the anatomy of a specific economic plant in both its nutritive and its reproductive structures. Thirteen families are represented, comprising the following genera: Zea, Triticum, Allium, Cannabis, Beta, Raphanus, Medicago, Pisum, Linum, Gossypium, Apium, Ipomoea, Solanum, Lycopersicum, Cucurbita, and Lactuca.

In both parts the author has contributed valuable discussion, both in the summary outline of the general subject, and the more compendious considerations of the particular economic plants treated. The presentation of plant anatomy with special reference to common field plants is particularly valuable, both from the botanical and the pedagogical points of view. It is a matter of common experience for teachers of general and more advanced courses to discover too often that detailed information about obvious features of everyday plants is hard to obtain. While readers of the Hayward text will not find a large number of species or all the details they may desire with respect to any one, this book is certainly valuable for reference, and should serve admirably as text.

Two Books for Amateur Gardeners*

George T. Hastings

The first of these is a booklet first published two years ago meant, as the title suggests, to give help and suggestions for the

* The Northern Garden—Week by Week. Daisy T. Abbott. University of Minnesota Press. 1938, second printing 1940. 94 pages, paper cover, 75 cents.

The Indoor Gardener. Daisy T. Abbott. University of Minnesota Press. 1939. viii+117 pages. $1.50.

gardener "Week by Week" from early February through October. Beginning with directions for planning various types of gardens and the buying of seed in February, the starting of seeds indoors in March, and all the outdoor work from April on the book is for gardeners who do all their own work in small gardens. The book will be valuable for the beginner starting her first garden and with no knowledge of how to proceed, also for the more seasoned gardener who wishes a more successful garden than in the past. The preface is a gem in itself, as witness—"Growing plants is a vice that attacks at any age; there is no cure, and the victim may as well realize that she will always have a lame back and dirty hands—but a beautiful disposition, if she is not called in to answer the telephone!"

The second book by Mrs. Abbott is for "The Indoor Gardener." Simple, easily-followed directions are given for all the work necessary for successfully growing plants in pots or boxes in the house. The plants described are the ordinary ones that everyone can secure and grow. There is advice on how to care for gift plants and how to grow miniature gardens under glass. Eighty drawings aid in the identification of common house plants. In addition there are formulas for insect sprays and for fertilizers. The book is attractively printed and bound and will be a delight as well as a guide to all those who try to keep plants in good condition in their homes.

FIELD TRIPS OF THE CLUB

Trip of March 8 to Pine Brook, N. J.

The rally trip scheduled for Sunday, March 3, was postponed because of snow, and held the following week in a temperature that hovered about the freezing point, aggravated by a violent gale. After a few hours, the eight members present found conditions unbearable, and the trip was abbreviated. Mr. Beals reported no mosses except what would be expected in that area. The fungi were few and of little interest.

Lichens were better represented. The many fine specimens of *Ilex opaca* in Hockhockson Swamp had their bark covered with

Trypethelium virens. On the way back to Pine Brook a White Oak was found harboring a large patch of *Lecanora miculata* near the root. This species had been reported from North America by Muhlenberg. It was described by Acharius in 1814. Tuckerman and Fink both record the local material as doubtful, but authentic specimens have been found in the southern states, and in Ohio. No material properly belonging to this species, however, had been collected in New Jersey or in any neighboring state. The writer's determination has been confirmed by Dr. Albert W. Herre and Dr. David H. Linder.

Cold fingers making further collection impossible, what was left of the party found a restaurant in Pine Brook where specimens could be examined and discussed while waiting for an excellent dinner of fried chicken, and the northbound train, stopped for us by the district superintendent in person.

G. G. Nearing

Trip of March 17 to Arden, N. Y.

Despite a sleet storm the previous day, and a foot to two feet of snow with an ice crust over the trails, four hardy souls went collecting lichens of the Hudson Highlands along the trail past Island Pond and over Hogencamp Mountain. On starting up the road beside the elk range, two Physcias, the olive-brown *Physcia obscura* and the slate gray *Physcia tribacia* were collected at the base of a white oak. *Cladonia delicata* f. *quercina* and *Cladonia coniocraea* f. *ceratodes* flourished on a stump which was projecting through the snow. Up on top of the hill overlooking the Ramapo valley the rock tripes, *Gyrophora Dillenii* and *Umbilicaria pustulata* grow on the exposed rocks of the summit.

At the outlet of Island Pond the sun had melted away the snow in a few places to expose *Cladonia papillaria* f. *molariformis, Cladonia caroliniana* f. *dilatata, Lecidea albocaerulescens,* and *Parmelia conspersa.* On trees along the trail were seen several other *Parmelias* including *P. sulcata, P. saxatilis, P. olivacea,* and *P. conspurcata.*

The "Lichen trail" over Hogencamp Mountain goes through a large colony of the "Iceland Moss," *Cetraria islandica,* discovered

by the late Raymond H. Torrey who inspired many of the local students of lichens. By digging through the snow in an appropriate spot, enough of the *Cetraria* was brought up to convince one of its existence under the winter cover. In addition to the two commoner species of rock tripe, *Gyrophora Muhlenbergii* and *Umbilicaria pennsylvanica* were collected on the projecting rocks. These also harbored *Biatorella simplex, Acarospora fuscata, Stereocaulon paschale, Lecanora rubina,* and *Rinodina oreina. Alectoria chalybeiformis, Cetraria Oakesiana,* and *Parmeliopsis aleurites* grow on the trees along the trail.

On the return trip, a small amount of *Baeomyces roseus* was dug out of the snow on the dirt road leading into Island Pond and an exposed road-cut which had melted out during the day yielded several more lichens, including *Cladonia bacillaris* f. *clavata, Cladonia coniocraea* f. *ceratodes. Cladonia chlorophaea* ffs. *simplex* and *carpophora, Cladonia furcata* var. *pinnata* f. *foliolosa, Cladonia cristatella* f. *vestita,* and *Cladonia pleurota.*

John W. Thomson, Jr.

Trip of March 31 to Floyd Bennett Field

Salt marshes are perhaps the least affected by adverse climatic conditions of any of our native habitats and are interesting throughout the year. The winter season really has one advantage in that there are no mosquitoes. The area which was visited—salt marshes west of Flatbush Avenue, Brooklyn—is one of the very last bits of natural terrain within the limits of New York City, but with the projected improvements in connection with Marine Park this wild condition will probably not endure. On the elevated portions of the salt marsh can be found a good growth of *Baccharis* and *Iva,* our two shrubby composites. There are plants of seaside goldenrod, a peculiar *Lactuca,* various grasses and sedges, and in the fall the marsh borders are rimmed with *Sabatia stellaris.* One of these little islands is a miniature sand dune covered with *Hudsonia tomentosa,* associated with *Cyperus Grayii* and *Carex silicea.* The remains of *Salicornia europaea* and the perennial *S. ambigua* were here in abundance, also *Atriplex patula, A. arenaria,* and *Suaeda linearis. Distichlis spicata* and *Juncus Gerardi* form the chief grass-matting of the salt marsh. In the wetter places there is plenty of *Spartina*

glabra var. *alterniflora;* this flowers when only a few inches high at the sandy borders of the marsh, whereas the same species may begin to flower when four or five feet in height in the deep waters of creeks. *Spartina patens* is abundant in moist places, with the coarser var. *juncea* usually occupying crests of dunes. *Eragrostis spectabilis* is one of the most abundant grasses, turning bright red in late fall. *Limonium* (sea lavender) and *Phragmites* are abundantly represented, as they are at the borders of practically every salt marsh.

It may be added that the vegetation of the salt marsh is one of the most difficult from the point of view of species identification. It has not been well studied, and the amateur can add a great deal to the information given in manuals. Ten members of the club enjoyed the trip.

HENRY K. SVENSON

TRIP OF MARCH 31 TO MAHWAH, N. J.

On Sunday, March 31, eleven members undeterred by a night of storm, a rainy morning and a forecast of rain, climbed the Ramapo ridge near Mahwah, N. J. Most of the twenty-five species of Cladonia recorded from that area were collected, and a number of other lichens characteristic of that district. Mosses were plentiful, but nothing rare encountered. Fungi were not much in evidence.

Because of flood water the small bogs, of which there were a number nearby, could not be explored. The flora of the stream bed was also submerged.

Cladonia piedmontensis, a lichen not previously reported from the neighborhood, and known from only three other counties in the state, was found. It is not rare, but rather local, and little known. Mr. Beals reported no important mosses.

G. G. NEARING

TRIP OF MAY 5 TO CROTON LAKE, N. Y.

Ten members and friends met near Croton Reservoir not far from Ossining for this trip. Arrangements were about the same as last year for the visit to this attractive region with its tumbling brook, small clear lake and wooded rocky hills. As Dr. Moldenke who led the trip last year was ill, the trip was led by the undersigned. Plants seen were much the same as before, though due to the cold weather many of those seen in blossom in 1939 were only in bud

this year. Among these were the wild geranium, sessil-leaved bellwort, blue cohosh, columbine, and shad bush. Sixteen ferns were seen, except for those with evergreen leaves, all in the fiddle-head stage. Fronds of the rattlesnake fern, *Botrychium virginianum,* were pushing their folded sterile leaves through the soil, or were straightening out and unfolding. *Botrychium obliquum* and the variety *dissectum* had last year's leaves still showing. In the stream bed *Conocephalum* was found with the fruiting stalks and pendant capsules fully developed. Attention was directed to the plants with imperfect flowers, either monoecious or dioecious—the aspen, sweet fern, bayberry, blue beech (Carpinus) and hop hornbeam (Ostrya) growing close together and giving splendid opportunity for comparison, red maple, spice bush, pussy toes (*Antennaria plantaginifolia*) and others.

George T. Hastings

Week-end Trip of May 3 to 5 to Mohonk Lake

The outstanding impression of this trip was the lateness of the spring. The last of the ice had disappeared from Mohonk Lake on April 29. Bird arrival dates have averaged later than the latest previous date during fifteen years of observation and few individuals have been present of most species. First flower dates were equally behind. Arbutus was at its height and very abundant. Shadbush and violets were not yet out.

Saturday's walk was down the east side of the mountain. On the way, in a north sloping ravine, considerable porcupine damage was noted. A previous survey had shown that all twenty-six trees from which bark had been eaten in this mixed second growth stand were hard maple. The threatening showers held off until we were eating our lunches in a log cabin. A visit was made to one of the Mohonk dairy farms where both Guernseys and Shorthorns are kept.

For those who did not wish to go out for an all-day walk, Mrs. A. Keith Smiley, Jr., conducted an afternoon walk. In the garden a beautiful specimen of Cornelian Cherry (*Cornus mas*) was seen.

In the evening we enjoyed an informal concert given for the Mohonk School Spring Carnival.

Sunday morning started with a before-breakfast bird walk. Later we headed for Rhododendron Swamp where we found red

trillium and marsh marigold just coming out. Many other spring flowers were well started but not yet in bloom.

We had the unexpected treat of seeing *Corema conradii* in bloom. A specimen collected the previous Saturday on Gertrude's Nose south of Minnewaska had come out in water.

DANIEL SMILEY, JR.

TRIP OF MAY 17-19 TO BRANCHVILLE, N. J.

This sixteenth Nature Conference of the Club was most successful. Seventy-eight persons were present for some or all of the trips. The season, due to the cool weather, was about two weeks late. Thus a few hepaticas (*Hepatica triloba*) were still in bloom, a patch of arbutus (*Epigaea repens*) had some of its fragrant flowers, the purple clematis (*Clematis verticillaris* or *Atragne americana*) was at its best with the bluish purple flowers trailing over the limestone rocks, and columbine (*Aquilegia canadensis*) had not reached the height of its bloom. The scarlet painted cup (*Castilleja coccinea*) which has been found in some fields in abundance in other years was not yet in blossom and the pink lady's slipper (*Cypripedium acaule*) and the showy orchid (*Orchis spectabilis*) showed only small buds. About some of the ponds visited the prickly ash or toothache-tree (*Zanthoxylum americanum*) had both the staminate and pistillate plants covered with the small flowers. Professor Medsger who led trips each day reports "The fronds of the fine colony of Goldie's fern were just pushing through the earth, apparently only one plant remains of the cluster of ostrich fern back of the hotel. In the talus at the foot of the cliff along the lake we found several plants of the bladder fern (*Cystopteris bulbifera*); apparently this is the first time this has been reported from The Pines, although I have found it west of Newton only a few miles away. Another plant new to the region and possibly to the state, is the European pepperwort (*Marsilia quadrifolia*). A small, but healthy colony is growing in the shallow water near the north end of the lake back of the inn. It would be interesting to know how this plant became established at Branchville—was it transplanted by human agency (no one at the inn knows of its coming) or were spores carried in mud on the feet of birds, or by some other means. The cluster of yellow lady's slipper (*Cypripedium parviflorum*) in

the woods near the hotel is increasing. We counted eighteen flowering plants. The area about The Pines is a fine example of what protection can do for our wild flowers. I first went to this spot in 1921, later I had the pleasure of assisting Dr. Gleason with the first Torrey Club trip on May 14-16, 1925. I have observed the gradual increase of a number of wild species of which the yellow lady's slipper is an example."

Dr. John Thomson, who led trips chiefly for the study of lichens, reports "On the two lichen trips to Stokes State Forest on Saturday a fine number of lichens was seen. A clay bank by the roadside yielded *Cladonia cristatella* f. *vestita, C. macilenta* f. *styracella, C. subcariosa* f. *evoluta, C. squamosa, C. mitrula* ffs. *imbricatula* and *pallida, C. chlorophaea* ffs. *simplex* and *carpophora, C. furcata* var. *pinnata* f. *foliosa* and *C. verticillata* f. *evoluta.* Nearby trees bore a rich flora on their barks including: *Parmelia rudecta, P. olivacea, P. physodes, P. conspurcata, P. caperata, Physcia endococcinea, P. tribacia, P. obscura, Lecanora subfusca, Cetraria Oakesiana, Graphis scripta* and an undertermined species of *Buellia.* Further along the road *Peltigera canina* and an abundance of the small lobes of *P. spuria* were discovered, the latter growing in especially large quantities in old burned places. Many of the boulders were covered with *Parmelia conspersa* and *Lecidea albocaerulescens,* and pebbles were often covered with a *Lecidea,* probably *L. parasema. Cladonia caespiticia* and *C. delicata* f. *quercina* were found on rotting logs. On the exposed rocks towards the top of Sunrise Mt. (1,640 feet) the rock tripes, *Gyrophora Dillenii, G. Muhlenbergii* and *Umbillicaria pustulata* were abundant, together with *Rinodina oreina* and *Biatorella clavus.* Soil pockets between the rocks and among huckleberry and blueberry shrubs supported *Cladonia sylvatica, C. caroliniana, C. papillaria* ffs. *molariformis* and *papillosa,* and *Baeomyces roseus.*

On the trip on Sunday to near Newton a few more species were obtained. *Dermatocarpon miniatum* and *Caloplaca cinnabarina* grew on limestone rocks. *Anaptychia speciosa* and *A. aquila* were collected on mosses and earth over the rocks."

Mr. William Hassler led trips to study amphibia and reptiles and reports that the following were found on the trips: SALAMANDERS—Newt and Eft (*Triturus viridescens*), Spotted (*Amblystoma maculatum*), Jeffersons (*A. jeffersonianum*), Marbled

(*A. opacum*), Slimy (*Plethodon glutinosus*), Red-backed (*P. cinereus*), also the Gray phase of the Red-backed, Red (*Pseudotriton ruber*) and Long-tailed (*Eurycea longicauda*). TURTLES—Spotted (*Clemmys guttata*) and Painted (*Chrysemys picta*). FROGS—Green (*Rana clamitans*), Bull (*R. catesbiana*), Pickerel (*R. palustris*), Spring Peeper (*Hyla crucifer*), Gray Tree Toad (*H. versicolor*) and Cricket (*Acris gryllus*). SNAKES—Black (*Coluber constrictor*), Milk (*Lampropeltis triangulatum*), Water (*Natrix sipedon*) and Garter (*Thamnophis sirtalis*).

Mr. Russell Evans led five bird hikes and reports the greatest number of birds seen in any recent year—107 species with the following recorded for the first time at one of the Torrey Club Branchville outings: Horned Grebe, American Merganser, Red-breasted Merganser, Ruffed Grouse, Common Loon, and Scaup Duck.

On Friday evening Mr. Hastings showed colored movies taken the past winter and spring in Florida and South Carolina and Professor Medsger gave an illustrated lecture on astronomy. Saturday evening Mr. Hassler talked on Exploring Near Home, showing most unusual movies of frogs, salamanders and snakes and of children collecting and studying them.

As in other years the arrangements at The Pines for the convenience of the Club were perfect, and our thanks are again extended to Mr. Husk and Mrs. Smith for their preparation for us and their thoughtfulness for our comfort.

G. T. HASTINGS

PROCEEDINGS OF THE CLUB

MINUTES OF THE MEETING OF MARCH 20

The meeting of the Torrey Botanical Club held at the New York Botanical Garden was called to order by the President, Dr. B. O. Dodge, at 3:30 P.M. The chair was given to the Vice-President, Mr. George T. Hastings, who presided at the meeting.

Twenty-nine persons were present.

The minutes of the meeting of March 5 were approved as read.

Thirteen candidates were elected to annual membership: Dr. Valentine Collamer Baker, 619 West 140th St., New York; Miss Helen Berdan, University of Western Ontario, London, Ontario,

Canada; Dr. Ora M. Clark, 110 North Pecan St., Bristow, Okla.; Mr. Carl O. Grassl, Division of Sugar Plant Investigations, Bureau of Plant Industry, Washington, D. C.; Dr. Tobias Lasser, 629 Forest Ave., Ann Arbor, Mich.; Dr. Harold L. Lyon, Experiment Station, H. S. P. A., Honolulu, Hawaii; Mrs. R. Burnside Potter, Smithtown, N. Y.; Dr. Louis Harry Roddis, Hospital Corps School, San Diego, Calif.; Dr. Paul B. Sears, Oberlin College, Oberlin, O.; Mr. John A. Stevenson, 4113 Emery Place, N. W., Washington, D. C.; Dr. F. W. Went, California Institute of Technology, Pasadena, Calif.; Dr. Eula Whitehouse, Texas Memorial Museum, Austin, Tex.; and Dr. Kenneth E. Wright, French Road, Kingston, R. I.

Three candidates were elected to associate membership: Miss Annette Hochberg, 251 West 89th St., New York; Mrs. Warren Kinney, Morristown, N. J.; and Miss Marion L. White, 258 Lafayette Ave., Passaic, N. J.

The scientific program consisted of a lecture by Professor E. W. Sinnott on "Some Problems of Cell Behavior in Plant Development." The speaker's abstract follows:

"An understanding of the mechanism of plant development requires a knowledge of the activities of cells during growth. Three aspects of cell activity have recently been investigated in our laboratory as follows:

(1) Roots of small-seeded grasses grown on damp paper may be examined with the high power from time to time and their growth studied in terms of cell size and cell number by means of camera lucida drawings. Such studies make it clear that (a) cells do not slide past each other during growth, (b) the newly formed cell walls are never opposite walls of adjacent cells, (c) the cell grows at different rates in its various parts, and (d) cell enlargement after division ceases begins first at its basal end and progresses toward the apex.

(2) Measurements of cell size and cell number in developing cucurbit fruits show that the innermost tissues as compared with the outer have cells which reach a larger size before division ceases, and that they cease division earlier. Small fruited types as compared to large ones have somewhat smaller cells both before cell division ceases and at the end of cell expansion; and division in all tissues ceases at about the same time in small types but is spread over a much longer period in large ones.

(3) Changes in shape of fruit during development is related to differences in plane of cell division. This was studied particularly in wounded tissues and here it was found that the first indication of the plane in which a cell was to divide was provided by an aggregation of cytoplasm in approximately the plane of the first cell wall."

After the meeting adjourned tea was served by the New York Botanical Garden.

Clyde Chandler
Recording Secretary

Minutes of the Meeting of April 2

The meeting or the Torrey Botanical Club held at the American Museum of Natural History was called to order by the President, Dr. B. O. Dodge, at 8:15 P.M.

Fifty-three persons were present.

The minutes of March 20 were adopted as read.

The following were elected to membership in the Club:

Annual: Mrs. William H. Conroy, Washington, Conn.; Mrs. Mortimer J. Fox, Foxden, Peekskill, N. Y.; Mr. Harold E. Parks, Spruce Cove, Trinidad, Calif.; and Dr. Kenneth B. Raper, Bureau of Plant Industry, U. S. Dept. of Agriculture, Washington, D. C.

Associate: Mr. Jack Greer, 75 Fort Washington Ave., New York; Mr. Roy Latham, Orient, N. Y.; and Miss Albina Marie McCarthy, Apartment 22, 50 Morningside Drive, New York.

The transfer of Mr. George F. Dillman, Edgewood School, Greenwich, Conn., from associate membership to annual membership was approved by the Club.

Dr. Roger P. Wodehouse gave a well illustrated lecture on "Hayfever and Civilization."

The meeting adjourned at 9:30 P.M.

Clyde Chandler
Recording Secretary

Minutes of the Meeting of April 17

The meeting of the Torrey Botanical Club held at the New York Botanical Garden was called to order by the President, Dr. B. O. Dodge, at 3:30 P.M.

Thirty persons were present.

The minutes of April 2 were adopted as read.

The following were elected to membership in the Club:

Annual: Dr. Franklin J. Bacon, Western Reserve University, Cleveland, O.; Dr. Robert Bloch, Department of Botany, Columbia University, New York; Dr. Dalton Milford Brown, State Teachers College, Johnson City, Tenn.; Dr. J. Emile Jacques, 2090 Vendome

Ave., Montreal, Canada; Mr. Clyde H. Jones, Department of Botany, Ohio State University, Columbus, O.; Miss Georgiana M. Lawrence, 2 East 21st St., Brooklyn, N. Y.; Dr. Henry H. M. Lyle, 1217 Park Ave., New York; Mr. Ray E. Penn, 642 Tenth Ave., Honolulu, Hawaii; and Dr. John W. Roberts, U. S. Horticultural Station, Beltsville, Md.

Associate: Miss Lora Bond, Botany Department, Wellesley College, Wellesley, Mass.; and Mr. James Kingston McGrath, 717 West 177th St., New York.

The President appointed the following members of the Torrey Club as delegates to the Eighth American Scientific Congress to be held in Washington, D. C., May 10-18:

Section II—Biological Sciences: Dr. Harold W. Rickett, New York Botanical Garden; Dr. Edmund H. Fulling, New York Botanical Garden; Prof. Ernst E. Naylor, University of Missouri, Columbia, Mo. (temporary address, New York Botanical Garden); Dr. P. W. Zimmerman, Boyce Thompson Institute for Plant Research, Yonkers, N. Y.; Prof. Burton E. Livingston, Johns Hopkins University, Baltimore, Md.; Dr. Charles Thom, Bureau of Plant Industry, Washington, D. C.

Section IV—Agriculture and Conservation: Dr. John Stevenson, Bureau of Plant Industry, Washington, D. C.; Dr. Frank D. Kern, Pennsylvania State College, State College, Pa.; Dr. Leon Grodsinsky, Ministerio de Agriculture, Division de Fitopathologia, Buenos Aires, Argentine.

Section V—Public Health and Medicine: Dr. W. S. Thomas, 1141 Fifth Ave., New York; Dr. J. Gardner Hopkins, College of Physicians and Surgeons, Columbia University, New York.

Section VI—Physical and Chemical Sciences: Dr. William J. Robbins, New York Botanical Garden.

The scientific program consisted of a lecture on "Light and Temperature on the Growth of Flowering Plants," by Dr. John M. Arthur of Boyce Thompson Institute for Plant Research, Inc. The speaker's abstract follows:

"Both dry weight and flower production of plants depend upon such factors as light intensity, day length, temperature, and carbon dioxide supply. Sunlight in May, June, and July is too high in intensity for maximum dry weight production. When plants are grown under shading cloth at this time, which reduces sunlight by twenty-five per cent, more dry weight of plant tissue is

produced. During August and September sunlight is barely sufficient to produce maximum dry weight and from October to March sunlight definitely limits dry weight production. We cannot compete with the enormous energy of sunlight by growing plants in basement rooms under all artificial light. The best arrangement at present is to use sunlight in a greenhouse while it lasts, and to supplement for a period of three to five hours each night with artificial light. For this work the most practical method is to use 500-watt tungsten filament lamps spaced at distances of three to four feet along a three-foot growing bench. The period of burning of the lamps can best be regulated by a thermostat which lights the plants intermittently in intervals of about ten minutes on and ten to thirty minutes off all during the night. The off period is determined by the rate of heat loss to the outside atmosphere and varies mainly with the outside temperature. This system of lighting can be used with plants which require a low temperature since the heat output of the lamps is closely controlled. Such plants as gladiolus, calceolaria, carnation, gardenia, hyacinth (following a three-months' cold treatment), lily, orchid, and strawberry respond well to such intermittent lighting. *Crassula rubicunda* and digitalis were also brought into flower following a five-months' low temperature treatment.

In the search for a more ideal light source for growing plants entirely with artificial light, a lighting unit consisting of four sodium vapor lamps supplemented by either three 60-watt Mazda or one 400-watt capillary mercury lamp gave good results with gladiolus, cotton, and geranium. The plants were exposed continuously (for a whole year in some cases) to the sodium vapor lamps, while the supplemental Mazda or mercury lamps were burned intermittently for three-fourths of an hour twice each morning and again twice each evening. The temperature was regulated accurately at 63° F."

After the meeting adjourned at 4:30 P.M. tea was served by the New York Botanical Garden.

Clyde Chandler
Recording Secretary

Minutes of the Meeting May 7

The meeting, held at the American Museum of Natural History, was called to order by the President at 8:15.

Eighty-six persons were present.

The minutes of the meeting of April 17 were adopted as read.

Due to the absence of the secretary the president appointed the vice-president, Mr. Hastings, to act as secretary for the meeting.

The following were elected to membership in the Club:

Annual: Miss Marie B. Clark, 1420 Duncan St., N. E., Washington, D. C.; Dr. Ralph Emerson, Biological Laboratories, Harvard University, Cambridge, Mass.; Miss Louise Eden Guild, Mile-

stone House, Norton, Conn.; Mrs. Anne M. Schaefer, 74 Fairview Ave., Jersey City, N. J.; Prof. William-Henri Schopfer, Botanical Institute, University of Bern, Bern, Switzerland; Dr. Alfred Ursprung, Institute Botanique de l'Université, Fribourg, Switzerland.

Associate: Miss Bessie Lumnitz, George Washington High School, Isham Annex, 212th St. and Broadway, New York; Mr. Erich W. Peters, 63-01 Dry Harbor Rd., Elmhurst, Long Island, N. Y.; and Dr. C. D. Sherbakoff, University of Tennessee Agricultural Experiment Station, Knoxville, Tenn. Miss Clara Burghart, 419 Devon St., Kearney, N. J., was transferred from annual to associate.

The program for the evening was an illustrated talk by Mr. Rutherford Platt on "Magnified Color Photography in Nature." With a very beautiful series of kodachrome slides Mr. Platt started in at Charleston, S. C., showing blossoming plants of *Sarracenia flava* and *S. rubra* and the Venus Fly-trap, *Dionea*. In the latter details were shown of the leaves with the reddish inner surfaces which help in attracting insects. Then views were shown in the Pine Barrens in early spring and in the immediate vicinity of New York in winter. Magnified views of winter buds and their internal structure, of catkins of alder, birch and hazelnut, of winter weeds, of lichens and of the bark of trees showed how much color was to be found during the winter if one looks for it.

After the talk questions were asked as to the methods used in taking the pictures and the equipment necessary.

The meeting adjourned at nine-thirty.

George T. Hastings
Acting Secretary

NEWS NOTES

Dr. Marcus M. Rhoades, geneticist of the U. S. Department of Agriculture, has been appointed associate professor of botany at Columbia University. Dr. Rhoades will cooperate with Dr. Th. Dobzhansky, who has been appointed professor of zoology, in directing work in the laboratory of genetics, established two years ago to unite the work in botany and zoology of the University.

Dr. Robert V. Drexler, of the department of botany of the University of Illinois, has been appointed an instructor in botany at Coe College, Iowa.

Brooklyn Botanic Garden. In the annual report of the Garden for 1939 the attendance for the year is given as over 1,798,000, the largest in the history of the Garden. The herbarium was increased by over 45,000 specimens. Exhibits were maintained at the World's Fair in the Gardens on Parade, in the New York State Building and in the City Building. Research work was continued on the resistance of oat hybrids to various races of smut, on breeding chestnuts resistant to blight, on hybridizing iris, on genetics, and on systematic botany.

New York Botanical Garden. The annual report for 1939 lists improvements made to the museum building, including the preparing of work rooms and a class room in the basement; planting and the laying out of new walks on the grounds; changes in the green houses and the formal opening of one house as a tropical flower garden. 2,950 plants and 3,900 bulbs were planted in the Thompson Memorial Rock Garden and 1,500 plants put out in the Wild Flower Garden. To the herbarium were added some 30,000 specimens, bringing the total to over 1,900,000. The garden had an exhibit in the Gardens on Parade and in the City Building at the World's Fair.

Dr. C. Stuart Gager, director of the Brooklyn Botanic Garden, was elected an honorary member of the Royal New Zealand Institute of Horticulture at a recent meeting of the Institute.

Dr. J. Andrew Drushel, professor of education at New York University, died on June 20, in Plainfield, N. J. He joined the faculty of New York University in 1924 and for four years taught mathematics. In 1928 he became a professor of education. He was interested in botany and nature study. In 1920-21 he was president of the American Nature Study Society. He had been a member of the Torrey Botanical Club for many years. Dr. Drushel was sixty-seven years old.

Dr. Ferman L. Pickett, professor and head of the botany department at Washington State College for the last twenty-three years died on June 26 at Pullman, Washington. He was fifty-nine years old.

THE TORREY BOTANICAL CLUB

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

Vol. 40 September-October, 1940 No. 5

The Cladoniae of New Jersey—Second Supplement[1]

Alexander W. Evans

The writer's report on the *Cladoniae* of New Jersey (**25**)[2] was published in 1935 and recorded the results of exploration down to the close of 1934. This report was followed three years later by a supplement (**33**), which brought the record down to the close of 1937. The stations listed in the supplement were based largely on the careful collections made by Mr. Raymond H. Torrey, who gathered ample material in various parts of the state.

Since the death of Mr. Torrey in July, 1938, the exploration for *Cladoniae* in New Jersey has been continued with most interesting results by Mr. G. G. Nearing of Ridgewood, who is well known to readers of Torreya for his various articles on lichens. Mr. Nearing has not only made new discoveries in some of the localities visited by Mr. Torrey and others but has also collected in many additional localities. As a result our knowledge of local distribution within the state has been greatly increased, and certain species have proved to be more abundant and more widely distributed than the earlier reports indicated. The present supplement, which brings the record down to the close of 1939, is based very largely on Mr. Nearing's collections but includes a number of additional reports from speciments collected by Mr. W. L. Dix, Mrs. C. A. Dunham, Dr. J. A. Small, Dr. J. W. Thomson, and other botanists, most of whom are mentioned in the writer's report or first supplement.

During the past two years Dr. Heinrich Sandstede has published a supplement (**34**) to Vainio's *Monographia Cladoniarum universalis* (**22**) and two articles in Hannig and Winkler's Pflanzenareale on the distribution of the *Cladoniae* throughout the world (**35, 36**). In each of these important works references to New Jersey speci-

[1] Contribution from the Osborn Botanical Laboratory.

[2] Numbers in bold-face type refer to the titles given in the original report and first supplement and to the additional titles listed at the close of the second supplement.

mens are included. Another valuable memoir which cites New Jersey *Cladoniae* is H. des Abbayes' revision of the subgenus *Cladina* (**32**), which appeared in 1939. References in these various works which relate to definite New Jersey material will be listed under individual species in the present supplement.

In the following list, which adheres to the arrangement used in the original report, all records with neither dates nor collectors' names are based on specimens collected by Mr. Nearing in 1939; records marked simply "1938" are likewise based on Mr. Nearing's specimens. In all other cases both dates and collectors' names are given, and records dated 1937 or earlier are here published for the first time. With rare exceptions new records duplicating earlier records are omitted. Species and forms marked by asterisks (*) represent additions to the flora of New Jersey.

This second supplement adds 35 forms and the following three species to the *Cladoniae* of New Jersey: *C. vulcanica* Zolling., *C. nanodes* Robbins, and *C. gracilis* (L.) Willd. The total number of species now known from the state is 49. The specimens upon which the records are based are preserved in the herbarium of Yale University.

Subgenus 1. CLADINA

1. Cladonia rangiferina (L.) Web. (**25**, p. 84). Accredited to New Jersey, by des Abbayes (**32**, p. 146) on the basis of Mr. Nearing's specimens. Bergen: Bear Swamp Pond. Morris: Oak Ridge. Passaic: Bearfort Mountain, Franklin Clove, Haskell, and Mountain Glen Lakes near Upper Macopin. Sussex: Andover, Colesville, and Hamburg Mountain. Warren: Lookout Rock near Pequest (1938).

1a. Cladonia rangiferina f. crispata Coem. (**25**, p. 85). Passaic: Franklin Clove.

1c. Cladonia rangiferina f. prolifera Flot. (**25**, p. 85). Bergen: Bear Swamp Pond (det. Sandstede).

1e.* Cladonia rangiferina f. leucitica Flot. (**26**, p. 7). Passaic: Stonetown.

2. Cladonia sylvatica (L.) Hoffm. (**25**, p. 85). Listed from New Jersey by des Abbayes (**32**, p. 135) on the basis of Mr. Nearing's specimens. Bergen: Bear Swamp Pond, Darlington, Franklin Lake, and Paramus. Burlington: near Red Lion (*Dix,*

1939). CUMBERLAND: Vineland. MERCER: Sourland Mountain (*Dix,* 1939). MORRIS: Oak Ridge. OCEAN: Lakewood and Laurelton. PASSAIC: Bearfort Mountain, Haskell, Hewitt, Mountain Glen Lakes near Upper Macopin, and Stonetown. SUSSEX: Hamburg Mountain and Kittatinny Mountain.

2c.* CLADONIA SYLVATICA f. PROLIFERA Sandst. (**4**, p. 381). PASSAIC: Stonetown.

3. CLADONIA MITIS Sandst. (**25**, p. 86). Accredited to New Jersey by des Abbayes (**32**, p. 127) on the basis of Mr. Nearing's specimens. BERGEN: Bear Swamp Pond, Franklin Lake and Mills, near Mahwah (1938), Paramus (1938), Ridgewood (1938) Washington, and Wyckoff. BURLINGTON: Martha (1938). CUMBERLAND: Vineland. ESSEX: North Caldwell. MIDDLESEX: Old Bridge. MONMOUTH: Morganville and Spring Valley. OCEAN: Lakewood and Sim's Place. PASSAIC: Bearfort Mountain, Franklin Clove, and Hewitt. SUSSEX: Kittatinny Mountain.

3b. CLADONIA MITIS f. PROLIFERA Sandst. (**25**, p. 86). BERGEN: Bear Swamp Pond, Franklin Lake, and near Mahwah (1938). MONMOUTH: Morganville. PASSAIC: Bearfort Mountain.

4. CLADONIA TENUIS: (Floerke) Harm. (**25**, p. 86). In the opinion of des Abbayes the North American specimens which have been referred to *C. tenuis* are not identical with European specimens of this species. He therefore separates the North American plant as a geographical subspecies, to which he gives the name **Cladonia subtenuis* (**32**, p. 108), indicating the subspecific rank by means of the asterisk. In the true *C. tenuis,* according to his account, the ultimate podetial branches are curved in the same direction, whereas in **C. subtenuis* they are either straight or curved in various directions. In the southern parts of its range **C. subtenuis* seems to be amply distinct from the true *C. tenuis,* but in some of the more northern forms the differential features are less fully realized. On account of the existence of such forms des Abbayes hesitates to give **C. subtenuis* full specific rank. He lists his subspecies from New Jersey and cites specimens collected by Blake, Cohn, and Nearing, as well as those distributed in Lich. Bor.-Amer., No. 63 (see **25**, p. 86). According to his interpretation the specimens here listed under *C. tenuis* represent the subspecies **C. subtenuis* des Abbayes. BERGEN: Allendale, Bear Swamp Pond, Darlington, Emerson (1938), Franklin Lake and

Mills, Hohokus (1938), Mahwah (1938), Paramus, Saddle River (*Mrs. Dunham,* 1939), Waldwick, and Wyckoff. BURLINGTON: near Bordentown (*Dix,* 1939), Jenkins (1938), and Red Lion (*Dix,* 1939). ESSEX: Eagle Rock Reservation (1938) and North Caldwell. GLOUCESTER: Mullica Hill. HUNTERDON: Bissell, Oldwick, Rileyville, and Ringoes. MERCER: Dutch Neck, Hopewell (*Dix,* 1939) and Pennington (*Dix,* 1939). MONMOUTH: Ardena and Cranberry Hill. MORRIS: Green Village, Hanover Neck, New Vernon, Oak Ridge, and Waughaw Mountain. OCEAN: Forked River and Pasadena. PASSAIC: Franklin Notch (1938), Goffle Ridge near Haledon, Haskell, Hewitt, Monks, and Stonetown. SALEM: Centerton and Norma. SOMERSET: North Plainfield. SUSSEX: Andover, Colesville, Franklin, south of Lake Hartung Road (1938), Ogdensburg, and near Sussex (*Cohn,* 1937). WARREN: White Lake near Marksboro (1938).

4a. CLADONIA TENUIS f. SETIGERA Sandst. (**25**, p. 87). BERGEN: Mahwah (1938). BURLINGTON: near Bordentown (*Dix,* 1939) and Jenkins (1938).

4A. CLADONIA IMPEXA Harm. (**33**, p. 139). Listed from New Jersey by des Abbayes (**32**, p. 82), presumably on the basis of Cohn's specimens of f. *subpellucida* Harm. (**33**, p. 140) from Forked River, Ocean County. Mr. Nearing has since collected this form in the same locality.

Subgenus 2. PYCNOTHELIA

5a. CLADONIA PAPILLARIA (Ehrh.) Hoffm. f. MOLARIFORMIS (Hoffm.) Schaer. (**25**, p. 87). BERGEN: Closter, Darlington, Franklin Lake and Mills, Hillsdale (1938), Hohokus (1938), Mahwah (1938), Paramus (1938), Ridgewood (1938), Washington, and Wyckoff. BURLINGTON: Atsion (1938), near Bordertown (*Dix,* 1939), Green Bank (1938), and Martha (1938). GLOUCESTER: Mullica Hill. MIDDLESEX: Rhode Hall. MONMOUTH: Ardena and Morganville. MORRIS: Oak Ridge. OCEAN: Pasadena. PASSAIC: Hewitt and Monks. SALEM: Norma. SOMERSET: North Plainfield. SUSSEX: Kittatinny Mountain and Rock View near Montague.

5b. CLADONIA PAPILLARIA f. STIPATA Floerke (**25**, p. 87). BERGEN: Franklin Lake and Mahwah (1938). GLOUCESTER: Mullica Hill. PASSAIC: Haskell.

5c. Cladonia papillaria f. papillosa Fr. (**25**, p. 87). Bergen: Emerson (1938), Franklin Lake and Mills, Hohokus (1938), Mahwah (1938), Paramus (1938), Ridgewood (1938), Waldwick, Washington, and Wyckoff. Burlington: Green Bank (1938). Gloucester: Mullica Hill. Middlesex: Old Bridge and Rhode Hall. Monmouth: Ardena, Cranberry Hill, and Morganville. Morris: Green Village, Mt. Freedom, and Oak Ridge. Ocean: Forked River, Laurelton, and Pasadena. Passaic: Goffle Ridge near Haledon (1938), Haskell, Hewitt, Monks, and Stonetown. Salem: Norma. Somerset: Lamington. Sussex: Kittatinny Mountain.

5d.* Cladonia papillaria f. prolifera (Wallr.) Schaer. (**5**, p. 124). Sandstede (**34**, p. 22) reports this form from New Jersey without citing definite stations.

Subgenus 3. CENOMYCE

Section 1. Cocciferae

Subsection 1. Subglaucescentes

6a. Cladonia floerkeana (Fr.) Floerke var. intermedia Hepp (**25**, p. 88). Bergen: near Mahwah (1938). Essex: North Caldwell. Passaic: Haskell, Hewitt, and Stonetown. Sussex: Rock View nead Montague.

6b.* Cladonia floerkeana var. carcata (Ach.) Vainio (**4**, p. 394). Bergen: near Mahwah (1938) and Ridgewood (1938). Passaic: Stonetown. Sussex: Hamburg Mountain.

7. Cladonia bacillaris (Ach.) Nyl. (**25**, p. 88). Bergen: Allendale, Alpine, Bear Swamp Pond, Closter, Darlington, Franklin Lake and Mills, Hackensack (1938), Hillsdale (1938), Hohokus (1938), Mahwah (1938), Maywood (1938), Paramus (1938), Ridgewood (1938), Rochelle Park (1938), Saddle River (1938), Upper Saddle River (1938), Waldwick, Washington, and Wyckoff. Burlington: Brown's Mills (*Dix,* 1939), Green Bank (1938), Martha (1938), and Quaker Bridge (1938). Cumberland: Vineland. Essex: North Caldwell and South Mountain Reservation (1938). Gloucester: Bridgeport. Hunterdon: Bissell, Rileyville, and Sourland Mountain (*Dix,* 1939). Mercer: Mt. Rose. Middlesex: Old Bridge, Rhode Hall, and South River. Monmouth: Ardena, Cranberry Hill, Morganville, and Spring Valley. Morris:

near Charlotteburg (1938), Great Swamp near Mt. Vernon, Green Village, Littleton, Mt. Freedom, New Vernon (1938), Oak Ridge, and Waughaw Mountain. OCEAN: Forked River, Laurelton, Pasadena, and Sim's Place. PASSAIC: Franklin Notch (1938), Goffle Ridge (1938) and High Mountain near Haledon, Haskell, Hewitt (*Nearing & Thomson,* 1939), Monks, Mountain Glen Lakes near Upper Macopin, and Stonetown. SALEM: Centerton and Elmer. SOMERSET: Warrenville. SUSSEX: Andover, Colesville, Hamburg Mountain, Kittatinny Mountain, south of Lake Hartung Road (1938), Ogdensburg, Rock View near Montague, and near Sparta Lake (1938). UNION: Fanwood and Seely's Glen. WARREN: White Lake near Marksboro (1938).

7a.* CLADONIA BACILLARIS f. ABBREVIATA (Vainio) Harm. (**5**, p. 124). MONMOUTH: Spring Valley.

7b.* CLADONIA BACILLARIS f. CLAVATA (Ach.) Vainio (**4**, p. 397). CUMBERLAND: Vineland. OCEAN: Forked River.

7c.* CLADONIA BACILLARIS f. PERITHETA (Wallr.) Arn. (**4**, p. 397). PASSAIC: Hewitt and Mountain Glen Lakes near Upper Macopin.

7d.* CLADONIA BACILLARIS f. SUBTOMENTOSULA Sandst. (**6**, p. 38). CUMBERLAND: Vineland (*Nearing*, 1939, the earliest New Jersey record). OCEAN: Island Beach (*Dix,* 1939).

8a. CLADONIA MACILENTA Hoffm. f. STYRACELLA (Ach.) Vainio. (**25**, p. 88). BERGEN: Darlington, Franklin Lake and Mills, Mahwah, Ridgewood (1938), Rochelle Park (1938), Washington, and Wyckoff. ESSEX: North Caldwell. MONMOUTH: Spring Valley. MORRIS: Oak Ridge and Waughaw Mountain. OCEAN: Forked River and Pasadena. PASSAIC: Hewitt, Monks, and Stonetown. SUSSEX: Andover, Colesville, Hamburg Mountain, Kittatinny Mountain, and Rock View near Montague.

9b. CLADONIA DIDYMA (Fée) Vainio f. SUBULATA Sandst. (**25**, p. 89). OCEAN: Lakewood.

9c.* CLADONIA DIDYMA f. SQUAMULOSA Robbins (**5**, p. 127). OCEAN: Sim's Place.

9A.* CLADONIA VULCANICA Zolling. in Hasskarl, Natur.-Geneesk. Arch. Neêrlands Indie **1**:396. 1847. *C. didyma* var. *vulcanica* Vainio, Acta Soc. F. et Fl. Fennica **4**:145. 1887 (as ε *vulcanica*); Zahlbr. Cat. Lich. Univ. **4**:490. 1926. In its morpho-

logical features *C. vulcanica* is much like *C. didyma,* and certain writers still consider it a variety of that species. In 1931, however, Robbins and Blake (**12**, p. 154) expressed the opinion that its validity as a species should be recognized. The most important difference between the two is chemical in nature. In *C. didyma* there is no color change with potassium hydroxide and the reaction with paraphenylenediamine is either wholly negative or causes a pale yellow coloration. In *C. vulcanica,* on the other hand, potassium hydroxide gives a bright yellow color and paraphenylenediamine a definite red, indicating the presence of thamnolic acid (see **26**, p. 6), as in *C. macilenta.* The New Jersey specimens of *C. vulcanica* may be referred to the following form, in which the podetia are only 2.5-8 mm. in length:—

9Aa.* Cladonia vulcanica f. minor Robbins; in Robbins and Blake, Rhodora **33:** 154 *pl. 210,* f. 7. 1931. Morris: Great Swamp near Mt. Vernon. Ocean: Bamber Lake and Forked River.

Subsection 2. Stramineo-floridae

10. Cladonia pleurota (Floerke) Schaer. (**25**, p. 89). Bergen: Allendale, Alpine, Bear Swamp Pond, Darlington, Emerson (1938), Franklin Lake and Mills, Hohokus (1938), Mahwah (1938), Paramus (1938), Ridgewood (1938), Saddle River (*Mrs. Dunham,* 1939), Waldwick, Washington, and Wyckoff. Burlington: near Red Lion (*Dix,* 1939). Essex: Cedar Grove and North Caldwell. Hunterdon: Silver Hill. Mercer: Dutch Neck and Mt. Rose. Middlesex: Rhode Hall and South River. Monmouth: Ardena, Cranberry Hill, and Morganville. Morris: Great Swamp near Mt. Vernon, Green Village, Littleton, Mt. Freedom, New Vernon, Oak Ridge, and Waughaw Mountain. Ocean: Island Beach (*Dix,* 1939), and Pasadena. Passaic: Bearfort Mountain, Franklin Clove, Goffle Ridge and High Mountain near Haledon, Haskell, Hewitt, Monks, and Mountain Glen Lakes near Upper Macopin. Somerset: Lamington and Lyons. Sussex: Andover, Colesville, Hamburg Mountain, Kittatinny Mountain, south of Lake Hartung Road (1938), Rock View near Montague, and near Sparta Lake (1938). Union: Fanwood and Seely's Glen.

10a. Cladonia pleurota var. frondescens (Nyl.) Oliv. (**25**, p. 90). Bergen: Darlington. Gloucester: Mullica Hill.

11. Cladonia ravenelii Tuck. (**25**, p. 90). Accredited to New Jersey by Sandstede (**35**, p. 26; **36**, p. 99), presumably on the basis of the specimens recorded by the writer.

12. Cladonia cristatella Tuck. (**25**, p. 90). Accredited to New Jersey by Sandstede (**36**, p. 99). Bergen: Paramus (1938) and Ridgewood (1938). Essex: Cedar Grove and North Caldwell. Hunterdon: Bissell and Silver Hill. Mercer: Sourland Mountain (*Dix,* 1939). Morris: near Charlotteburg (1938). Passaic: Mountain Glen Lakes near Upper Macopin. Somerset: Lamington and Warrenville. Union: Mountainside. The specimens in this list are indefinite as to form.

12a. Cladonia cristatella f. beauvoisii (Del.) Vainio (**25**, p. 90). Bergen: Allendale, Bear Swamp Pond, Darlington, Emerson (1938), Franklin Lake and Mills, Hackensack (1938), Hohokus (1938), Mahwah (1938), Maywood (1938), Oradell (1938), Paramus (1938), Rochelle Park (1938), Saddle River (*Mrs. Dunham,* 1939), Upper Saddle River (1938), Waldwick, Washington (*Mrs. Dunham,* 1939), and Wyckoff. Burlington: Atsion (1938), near Bordentown (*Dix,* 1939), Green Bank (1938), Martha (1938), and Quaker Bridge (1938). Cumberland: Vineland. Essex: Cedar Grove and North Caldwell. Gloucester: Bridgeport and Mullica Hill. Hunterdon: Bissell, near Flemington (*Dix,* 1939), Oldwick, Rileyville, Ringoes, and Silver Hill. Mercer: Hopewell (*Dix,* 1939) and Rosedale. Middlesex: Metuchin, Old Bridge, Rhode Hall, and South River. Monmouth: Ardena, near Asbury Park (*Evans,* 1939), Cranberry Hill, and Morganville. Morris: Green Village, Hanover Neck, Littleton, Mt. Freedom, New Vernon, and Oak Ridge. Ocean: Forked River, Laurelton, and Pasadena. Passaic: Franklin Notch, Monks, and Mountain Glen Lakes near Upper Macopin. Salem: Elmer and Norma. Somerset: Lamington and Lyons. Sussex: Andover, Colesville, Hamburg Mountain, Kittatinny Mountain, and near Sparta Lake (1938). Union: Fanwood and Mountainside.

12b. Cladonia cristatella f. vestita Tuck. (**25**, p. 91). The present form accompanies f. *beauvoisii* in all the stations listed above except Silver Hill, Hanover Neck, Pasadena, and Andover. The following additional stations for f. *vestita* may also be recorded:—Bergen: Alpine and Hillsdale (1938). Essex: Eagle

Rock Reservation (1938) and South Mountain Reservation (1938). MERCER: Mt. Rose and Trenton (*Dix,* 1939). MIDDLESEX: Menlo Park. MONMOUTH: Spring Valley. MORRIS: Berkeley Heights, Great Swamp near Mt. Vernon, Meyersville and Waughaw Mountain. PASSAIC: Goffle Ridge (1938) and High Mountain near Haledon, Haskell, Hewitt, and Stonetown. SOMERSET: North Plainfield. SUSSEX: south of Lake Hartung Road (1938). UNION: Seely's Glen. WARREN: White Lake near Marksboro (1938) and Lookout Rock near Pequest (1938).

12c. CLADONIA CRISTATELLA f. SQUAMOSISSIMA Robbins (**25**, p. 91). BERGEN: Emerson (1938), Franklin Lake, Hohokus (1938), Mahwah (1938), Rochelle Park (1938), and Waldwick. BURLINGTON: near Bordentown (*Dix,* 1939). ESSEX: North Caldwell. MONMOUTH: Morganville.

12e. CLADONIA CRISTATELLA f. SCYPHULIFERA Sandst. (**25**, p. 91). BERGEN: Allendale, Closter, Darlington, Franklin Lake, Hohokus (1938), Mahwah (1938), Paramus, Rochelle Park (1938), Waldwick, Washington, and Wyckoff. ESSEX: North Caldwell. HUNTERDON: near Flemington (*Dix,* 1939) and Rileyville. MIDDLESEX: South River. MORRIS: Green Village, Littleton, Mt. Freedom, and New Vernon. PASSAIC: Mountain Glen Lakes near Upper Macopin. SALEM: Norma. SOMERSET: Lamington, Lyons, and Warrenville. SUSSEX: Andover and Kittatinny Mountain. UNION: Mountainside.

12f. CLADONIA CRISTATELLA f. OCHROCARPIA Tuck. (**25**, p. 91). BERGEN: Darlington, Mahwah (1938), Paramus (1938), and Washington. ESSEX: North Caldwell. PASSAIC: Franklin Clove. SALEM: Norma. SOMERSET: Lyons. SUSSEX: Andover.

12g. CLADONIA CRISTATELLA f. SQUAMULOSA Robbins (**25**, p. 91). BERGEN: Allendale, Emerson (1938), Franklin Lake, Hohokus (1938), Mahwah (1938), Maywood (1938), Paramus (1938), Ridgewood (1938), Rochelle Park (1938), and Washington. HUNTERDON: Oldwick and Rileyville. MERCER: Pennington (*Dix,* 1939). MIDDLESEX: Old Bridge. MORRIS: Green Village and New Vernon. OCEAN: Lakewood (*Dix,* 1939). PASSAIC: Franklin Clove. SOMERSET: Warrenville. UNION: Mountainside.

12h.* CLADONIA CRISTATELLA f. ABBREVIATA Merrill (**4**, p. 409). BERGEN: Allendale, Franklin Lake, Paramus, Ridgewood (1938), Rochelle Park (1938), and Washington. HUNTERDON:

Bissell. MIDDLESEX: Metuchin. SUSSEX: Rock View near Montague.

12i.* CLADONIA CRISTATELLA f. AURANTIACA Robbins (**6**, p. 41). BERGEN: Darlington, Franklin Mills, Hohokus (1938), and Mahwah (1938). HUNTERDON: Oldwick. SALEM: Norma.

12j.* CLADONIA CRISTATELLA f. PLEUROCARPA Robbins (**4**, p. 408). BERGEN: Alpine, Closter, Darlington, Emerson (1938), Hackensack (1938), and Wyckoff. BURLINGTON: near Bordentown (*Dix,* 1939). HUNTERDON: Oldwick. MONMOUTH: Cranberry Hill. MORRIS: Green Village, Littleton, and Oak Ridge. PASSAIC: High Mountain near Haledon. UNION: Mountainside.

13. CLADONIA INCRASSATA Floerke (**25**, p. 91). BERGEN: Bear Swamp Pond and Ridgewood (1938). MONMOUTH: Cranberry Hill. MORRIS: Great Swamp near Mt. Vernon (1938). OCEAN: Bamber Lake, Forked River, Lakewood (*Dix,* 1939), Laurelton, and Sim's Place. PASSAIC: Haskell and Stonetown. SUSSEX: Andover, Kittatinny Mountain, and Rock View near Montague.

13a. CLADONIA INCRASSATA f. SQUAMULOSA (Robbins) Evans (**25**, p. 92). OCEAN: Bamber Lake.

13b.* CLADONIA INCRASSATA f. EPIPHYLLA (Fr.) Vainio, Acta Soc. F. et Fl. Fennica **14**:231. 1897 (as modification); Zahlbruckner, Cat. Lich. Univ. **4**:551. 1927 (as form). *C. cornucupioides* f. *epiphylla* Fr. Nov. Sched. Crit. 20. 1826. SUSSEX: Andover. New to North America. In this form the podetia are so reduced that the apothecia appear to be sessile or nearly so on the primary squamules.

Section 2. OCHROPHAEAE

Subsection 1. UNCIALES

14. CLADONIA UNCIALIS (L.) Web. (**25**, p. 92). BERGEN: Bear Swamp Pond, Franklin Lake, near Mahwah (1938), and Paramus. BURLINGTON: near Bordentown (*Dix,* 1939) and Jenkins (1938). CUMBERLAND: Vineland. GLOUCESTER: Mullica Hill. HUNTERDON: Mt. Airy (*Dix,* 1939). MIDDLESEX: Old Bridge, Rhode Hall, and South River. MONMOUTH: Ardena, near Asbury Park (*Evans,* 1939), Cranberry Hill, Morganville, and Spring Valley. MORRIS: Oak Ridge. OCEAN: Island Beach, Pasadena, and Sim's Place. PASSAIC: Bearfort Mountain, Franklin Notch (1938), Goffle Ridge near Haledon, Haskell, Hewitt (*Nearing &*

Thomson, 1939), Monks, Mountain Glen Lakes near Upper Macopin, and Stonetown. SUSSEX: Andover, Colesville, and Hamburg Mountain. UNION: Seely's Glen.

14a. CLADONIA UNCIALIS f. OBTUSATA (Ach.) Vainio (**25**, p. 92). OCEAN: Lakehurst (*Cohn,* 1936).

14d. CLADONIA UNCIALIS f. SPINOSA Oliv. (**25**, p. 93). BERGEN: Paramus. PASSAIC: Stonetown.

14e. CLADONIA UNCIALIS f. SETIGERA Anders (**25**, p. 93). BERGEN: Ridgewood (1938). BURLINGTON: Quaker Bridge (1938). MIDDLESEX: Old Bridge. MONMOUTH: Morganville.

15a. CLADONIA CAROLINIANA (Schwein.) Tuck. f. DILATATA Evans (**25**, p. 93). BERGEN: Allendale and Bear Swamp Pond. BURLINGTON: near Red Lion (*Dix,* 1939). CUMBERLAND: Vineland. OCEAN: Lakewood (*Dix,* 1939), Laurelton, Pasadena, and Sim's Place. PASSAIC: Franklin Clove, Haskell, Hewitt, Monks, Mountain Glen Lakes near Upper Macopin, and Stonetown.

15c. CLADONIA CAROLINIANA f. TENUIRAMEA Evans (**25**, p. 93). BERGEN: near Mahwah (1938). BURLINGTON: Green Bank (1938) and Martha (1938). CUMBERLAND: Vineland. MONMOUTH: near Asbury Park (*Evans,* 1939) and Cranberry Hill. OCEAN: Bamber Lake, Forked River, Laurelton, and Sim's Place. PASSAIC: Stonetown. SUSSEX: Hamburg Mountain and Kittatinny Mountain.

15e.* CLADONIA CAROLINIANA f. PROLIFERA Evans (**5**, p. 139). PASSAIC: Goffle Ridge near Haledon, Monks, and Stonetown. SUSSEX: Andover.

Subsection 2. CHASMARIAE

Group 1. MICROPHYLLAE

17. CLADONIA FURCATA (Huds.) Schrad. (**25**, p. 94). MIDDLESEX: Rhode Hall (young plants).

17a. CLADONIA FURCATA var. RACEMOSA (Hoffm.) Floerke (**25**, p. 95). BERGEN: Bear Swamp Pond, Franklin Lake, and Mahwah (1938). HUNTERDON: Rileyville and Ringoes. MERCER: Hopewell (*Dix,* 1939) and Pennington (*Dix,* 1939). OCEAN: Island Beach (*Dix,* 1939). PASSAIC: Haskell, Hewitt, and Stonetown. SUSSEX: Andover, Colesville, Hamburg Mountain, and near Sussex (*Cohn,* 1936).

17ab. CLADONIA FURCATA var. RACEMOSA f. SQUAMULIFERA Sandst. (**25**, p. 95). BERGEN: Darlington and Franklin Lake. HUNTERDON: Rileyville and Ringoes. MERCER: Pennington (*Dix,* 1939). PASSAIC: Bearfort Mountain, Franklin Notch (1938), Haskell, Hewitt, Monks, Mountain Glen Lakes near Upper Macopin, and Stonetown. SUSSEX: Franklin, Hamburg Mountain, Rock View near Montague, east of Sparta Lake (1938), and near Sussex (*Cohn,* 1937, det. Sandstede). UNION: Seely's Glen. WARREN: White Lake near Marksboro (1938) and Lookout Rock near Pequest (1938).

17ac. CLADONIA FURCATA var. RACEMOSA f. FURCATOSUBULATA (Hoffm.) Vainio (**33**, p. 144). ESSEX: Eagle Rock Reservation (1938). MORRIS: Oak Ridge.

17b.* CLADONIA FURCATA var. PALAMAEA (Ach.) Vainio (**4**, p. 425). MERCER: Hopewell (*Dix,* 1939).

17Aa. CLADONIA SCABRIUSCULA (Del.) Leight. f. FARINACEA (Vainio) Sandst. (**33**, p. 144). BERGEN: Franklin Lake. HUNTERDON: Rileyville. MORRIS: Green Village.

18. CLADONIA FLORIDANA Vainio (**25**, p. 95). Accredited to New Jersey by Sandstede (**36**, p. 100). BURLINGTON: Martha (1938) and New Lisbon (*Dix,* 1939). MIDDLESEX: Old Bridge. MONMOUTH: near Asbury Park (*Evans,* 1939) and Cranberry Hill. OCEAN: Forked River, Laurelton, and Sim's Place. SUSSEX: Kittatinny Mountain.

18a. CLADONIA FLORIDANA f. TYPICA Robbins (**25**, p. 95). OCEAN: Bamber Lake.

18c.* CLADONIA FLORIDANA f. ELEGANS Robbins, Rhodora **29**:137. *pl. 157, f. 7.* 1927. OCEAN: Bamber Lake. The podetia of f. *elegans* are squamulose and sterile.

18d.* CLADONIA FLORIDANA f. BRACHIATA Robbins, Rhodora **29**:137 *pl. 157, f. 2-3.* 1927. BURLINGTON: Brown's Mills (*Dix,* 1939). The podetia of f. *brachiata* are sterile as in the preceding form but are destitute of squamules.

19. CLADONIA SANTENSIS Tuck. (**25**, p. 96). Listed from New Jersey by Sandstede (**36**, p. 100). OCEAN: Forked River and Sim's Place.

20. CLADONIA SQUAMOSA (Scop.) Hoffm. (**25**, p. 96). BERGEN: Bear Swamp Pond and Franklin Mills. ESSEX: North Cald-

well. Morris: near Charlotteburg (1938). Ocean: Forked River. Passaic: Bearfort Mountain and Mountain Glen Lakes near Upper Macopin. Sussex: near Flat Brook (*Bowen,* 1932), Hamburg Mountain, and Kittatinny Mountain. The specimens in this list are indefinite as to form.

20c. Cladonia squamosa f. levicorticata Sandst. (**25**, p. 97). Bergen: Emerson (1938) and Ridgewood (1938). Cumberland: Vineland. Gloucester: Mullica Hill. Middlesex: Old Bridge, Rhode Hall, and South River. Monmouth: near Asbury Park (*Evans,* 1939), Morganville, and Spring Valley. Morris: Littleton. Ocean: Forked River (*Cohn,* 1937), Island Beach (*Dix,* 1939) and Lakewood (*Dix,* 1939).

20ca. Cladonia squamosa f. levicorticata m. pseudocrispata Sandst. (**25**, p. 97). Ocean: Pasadena.

20cb. Cladonia squamosa f. levicorticata m. rigida (Del.) Evans (**25**, p. 97). Bergen: Allendale, Alpine, Bear Swamp Pond, Darlington, Franklin Lake and Mills, Hohokus (1938), near Mahwah (1938), Maywood (1938), Paramus (1938), Ridgewood (1938), Saddle River (*Mrs. Dunham,* 1939), Upper Saddle River (1938), Washington (*Mrs. Dunham,* 1938), and Wyckoff. Burlington: Jenkins (1938), Martha (1938), New Lisbon (*Dix,* 1939), and Quaker Bridge (1938). Essex: Cedar Grove and North Caldwell. Hunterdon: Oldwick. Mercer: Dutch Neck and Sourland Mountain (*Dix,* 1939). Middlesex: South River. Monmouth: Ardena. Morris: near Charlotteburg (1938), Green Village, Hanover Neck, and New Vernon. Ocean: Sim's Place. Passaic: Franklin Notch (1938), Hewitt, and Stonetown. Somerset: North Plainfield and Warrenville. Union: Fanwood, Mountainside, and Watchung.

20cc. Cladonia squamosa f. levicorticata m. pityrea (Arn.) Evans (**33**, p. 145). Bergen: Darlington, Hohokus (1938), near Mahwah (1938), and Paramus (1938). Burlington: Atsion (1938) and Brown's Mills (*Dix,* 1939). Essex: North Caldwell. Gloucester: Mullica Hill. Monmouth: Ardena and Cranberry Hill. Morris: Green Village. Ocean: Lakehurst (*Cohn,* 1936), Lakewood (*Dix,* 1939), and Sim's Place. Passaic: Franklin Clove and Hewitt. Salem: Centerton. Sussex: Kittatinny Mountain and Rock View near Montague. Union: Seely's Glen. Warren: White Lake near Marksboro (1938).

20g. Cladonia squamosa f. murina Scriba (**33**, p. 145). Bergen: Bear Swamp Pond (det. Sandstede).

20h.* Cladonia squamosa f. callosa (Del.) Anders (**6**, p. 45). Sussex: High Point Park (1938, det. Sandstede).

20i.* Cladonia squamosa f. squamosissima Floerke (**4**, p. 434). Passaic: Haskell.

21. Cladonia delicata (Ehrh.) Floerke (**25**, p. 98). Gloucester: Bridgeport. Morris: Green Village. New Vernon, and Waughaw Mountain. Salem: Elmer. Sussex: Andover and Rock View near Montague. The specimens upon which these records are based are incompletely developed and show few or no podetia.

21a. Cladonia delicata f. quercina (Pers.) Vainio (**25**, p. 98). Bergen: Bear Swamp Pond, Darlington, Franklin Lake and Mills, Hohokus (1938), Paramus, Ridgewood (1938), Saddle River (1938), Washington, and Wyckoff. Burlington: Martha (1938). Hunterdon: Mountainville and Rileyville. Middlesex: Rhode Hall. Monmouth: Ardena and Cranberry Hill. Morris: Great Swamp near Mt. Vernon and Meyersville. Ocean: Sim's Place. Passaic: Franklin Notch (1938), Haskell, Hewitt (*Nearing & Thomson,* 1939), and Mountain Glen Lakes near Upper Macopin. Sussex: Hamburg Mountain. Union: Fanwood.

22. Cladonia caespiticia (Pers.) Floerke (**25**, p. 98). Bergen: Alpine, Closter, Darlington, Emerson (1938), Franklin Mills, Hackensack (1938), Hohokus (1938), near Mahwah (1938), Ridgewood (1938), Rochelle Park (1938), Saddle River (1938), Washington, and Wyckoff. Burlington: Martha (1938). Essex: North Caldwell. Gloucester: Bridgeport. Mercer: Dutch Neck. Middlesex: South River. Monmouth: Cranberry Hill. Morris: Green Village and Mt. Freedom. Ocean: Lakewood. Passaic: Franklin Clove, Great Swamp near Mt. Vernon, High Mountain near Haledon, Haskell, and Hewitt. Salem: Centerton and Elmer. Sussex: Hamburg Mountain and Kittatinny Mountain. Union: Fanwood and Seely's Glen.

22A.* Cladonia nanodes Robbins in Sandstede, Fedde's Repert. Spec. Nov. Regn. Veg. **103** (Beih.): 60. 1938. Atlantic: Port Republic (*Torrey,* 1936, det. Sandstede). According to Sandstede's brief description of *C. nanodes* the primary squamules are

small and the strongly convex apothecia almost sessile. He notes also that the species is negative with potassium hydroxide and positive with paraphenylenediamine. In these respects it agrees with *C. caespiticia* and *C. apodocarpa,* and Sandstede considers it a relative of the latter. Although he gives no stations for *C. nanodes* the name was first applied by Robbins to specimens from Wareham, Massachusetts, and this may be regarded as the type-locality. In the material from New Jersey the primary squamules are smaller than those of *C. apodocarpa* and fail to show the caducous habit characteristic of that species. They differ from the primary squamules of *C. caespiticia* in being undivided or only sparingly lobed.

Group 2. Megaphyllae

23. Cladonia apodocarpa Robbins (**25**, p. 98). Bergen: Alpine, Bear Swamp Pond, Darlington, Franklin Lake, and Mahwah (1938). Essex: North Caldwell. Hunterdon: Rileyville and Ringoes. Morris: Great Swamp near Mt. Vernon, Mt. Freedom, Oak Ridge, Stirling, and Waughaw Mountain. Ocean: Pasadena. Passaic: Franklin Notch (1938), Goffle Ridge near Haledon, Haskell, Hewitt, Monks, Mountain Glen Lakes near Upper Macopin, and Stonetown. Salem: Centerton. Somerset: Lyons. Sussex: Andover, Colesville, Hamburg Mountain, Kittatinny Mountain, Ogdensburg, Rock View near Montague, and near Sparta Lake (1938). Union: Seely's Glen. Warren: White Lake near Marksboro (1938) and Lookout Rock near Pequest (1938).

Subsection 3. Clausae

Group 1. Podostelides

24. Cladonia mitrula Tuck. (**25**, p. 99). Listed from New Jersey by Sandstede (**35**, p. 88). Bergen: Upper Saddle River. Hunterdon: Bissell. Passaic: Franklin Clove (1938). These specimens consist of little more than the primary squamules.

24a. Cladonia mitrula f. imbricatula (Nyl.) Vainio (**25**, p. 99). Bergen: Bear Swamp Pond, Darlington, Franklin Lake and Mills, Hohokus (1938), Mahwah (1938), Maywood (1938), Ridgewood (1938), Saddle River (*Mrs. Dunham,* 1939), Upper Saddle River (1938), Waldwick, Washington (*Mrs. Dunham,*

1938), and Wyckoff. BURLINGTON: Martha (1938). ESSEX: North Caldwell. GLOUCESTER: Bridgeport. HUNTERDON: Bissell, near Flemington (*Dix,* 1939), Mountainville, Oldwick, Ringoes, Silver Hill and Sourland Mountain (*Dix,* 1939). MERCER: Dutch Neck, Hopewell (*Dix,* 1939), Pennington (*Dix,* 1939), and Rosedale. MONMOUTH: Cranberry Hill. MORRIS: Great Swamp near Mt. Vernon, Green Village, Meyersville, Mt. Freedom, New Vernon, and Oak Ridge. OCEAN: Lakewood and Sim's Place. PASSAIC: Franklin Clove, Haskell, Hewitt (*Nearing & Thomson,* 1939), and Mountain Glen Lakes near Upper Macopin. SALEM: Centerton and Elmer. SOMERSET: Lyons. SUSSEX: Kittatinny Mountain and near Sparta Lake (1938). UNION: Fanwood. WARREN: White Lake near Marksboro (1938) and Pequest (1938).

24b. CLADONIA MITRULA f. PALLIDA Robbins (**25**, p. 99). BURLINGTON: Martha (1938). HUNTERDON: near Flemington (*Dix,* 1939) and Oldwick. MERCER: Pennington (*Dix,* 1939). MONMOUTH: Cranberry Hill. PASSAIC: Hewitt. SUSSEX: Andover (*Dix,* 1939) and Kittatinny Mountain.

24c.* CLADONIA MITRULA f. SQUAMULOSA Merrill, Bryologist **27**:23. 1924. MERCER: Pennington (*Dix,* 1939). MIDDLESEX: Matuchin (*Nearing,* 1939, the earliest New Jersey record). SUSSEX: Andover (*Dix,* 1939). This interesting form is distinguished by the presence of squamules on the podetia. It was based on specimens collected by J. L. Sheldon at Sturgisson, West Virginia, and apparently no other stations have been recorded in the literature.

25. CLADONIA CLAVULIFERA Vainio (**25**, p. 100). Listed from New Jersey by Sandstede (**36**, p. 100). BERGEN: Allendale. GLOUCESTER: Bridgeport. SUSSEX: Andover. UNION: Seely's Glen. These specimens are not referable to any definite form.

25a. CLADONIA CLAVULIFERA f. NUDICAULIS Evans (**25**, p. 100). BERGEN: Darlington, Franklin Mills, Mahwah (1938), Paramus (1938), and Ridgewood (1938). BURLINGTON: Martha (1938). CUMBERLAND: Vineland. ESSEX: Cedar Grove, Eagle Rock Reservation (1938), and North Caldwell. MONMOUTH: Morganville. MORRIS: Mt. Freedom. PASSAIC: Hewitt. SALEM: Norma. SUSSEX: Colesville. UNION: Mountainside.

25b. CLADONIA CLAVULIFERA f. SUBVESTITA Robbins (**25**, p. 100). BERGEN: Darlington, Mahwah (1938) and Paramus (1938). CUMBERLAND: Vineland. ESSEX: North Caldwell. OCEAN: Island

Beach (*Dix,* 1939) and Lakewood (*Dix,* 1939). SALEM: Norma.

25d. CLADONIA CLAVULIFERA f. PLEUROCARPA Robbins (**33**, p. 146). BERGEN: Darlington and Franklin Mills. MORRIS: Mt. Freedom.

26. CLADONIA SUBCARIOSA Nyl. (**25**, p. 100). BERGEN: Emerson (1938), Franklin Mills, Hackensack (1938), Hillsdale (1938), Hohokus (1938), Maywood (1938), Rochelle Park (1938), Upper Saddle River (1938), Waldwick, Washington, and Wyckoff. MERCERS near Hopewell (*Dix,* 1939), Rosedale, and Trenton (*Dix,* 1939). PASSAIC: Franklin Notch (1938). SOMERSET: Lyons. SUSSEX: south of Lake Hartung Road (1938). UNION: Fanwood and Seely's Glen. WARREN: White Lake near Marksboro (1938). The specimens upon which these records are based are either sterile or indefinite as to form.

26a. CLADONIA SUBCARIOSA f. EVOLUTA Vainio (**25**, p. 100). BERGEN: Bear Swamp Pond, Darlington, Emerson (1938), Franklin Lake and Mills, Hohokus (1938), Maywood (1938), Paramus (1938), Ridgewood (1938), Saddle River (*Mrs. Dunham,* 1939), and Upper Saddle River (1938). BURLINGTON: near Red Lion (*Dix,* 1939). CUMBERLAND: Vineland. ESSEX: Cedar Grove and North Caldwell. GLOUCESTER: Bridgeport and Mullica Hill. HUNTERDON: Bissell, Mountainville, Oldwick, Rileyville, Ringoes, and Silver Hill. MERCER: Dutch Neck and Mt. Rose. MORRIS: Berkeley Heights, Green Village, Littleton, New Vernon, Oak Ridge, and Stirling. PASSAIC: High Mountain near Haledon, Haskell, Hewitt (*Thomson,* 1939), and Monks. SOMERSET: Lamington and Warrenville. SUSSEX: Andover, Colesville, Hamburg Mountain, and Rock View near Montague. WARREN: White Lake near Marksboro (1938).

26b. CLADONIA SUBCARIOSA f. SQUAMULOSA Robbins (**33**, p. 100). BERGEN: Darlington. ESSEX: Cedar Grove and North Caldwell. GLOUCESTER: Mullica Hill. HUNTERDON: Oldwick and Rileyville. MERCER: Sourland Mountain (*Dix,* 1939) and Mt. Rose. MORRIS: Green Village and New Vernon. PASSAIC: High Mountain near Haledon. SUSSEX: Ogdensburg.

26c.* CLADONIA SUBCARIOSA f. PLEUROCARPA Robbins (**4**, p. 451). HUNTERDON: Rileyville. SUSSEX: Colesville.

Group 2. THALLOSTELIDES

26B.* CLADONIA GRACILIS (L.) Willd. (**4**, p. 456). As already shown by the writer (**25**, p. 101) the earlier New Jersey records for *C. gracilis* were based on other species or were otherwise untrustworthy. It is now possible, however, to report the species definitely from the state. The form represented is the following:—

26Baa.* CLADONIA GRACILIS var. DILATATA (Hoffm.) Vainio f. SQUAMULOSA (Schaer.) Sandst. (**4**, p. 458). SUSSEX: Kittatinny Mountain.

27. CLADONIA VERTICILLATA (Hoffm.) Schaer. (**25**, p. 101). BERGEN: Allendale, Hohokus (1938), Ridgewood (1938), and Wyckoff. MORRIS: Littleton. These records are based on incompletely developed specimens.

27a. CLADONIA VERTICILLATA f. EVOLUTA (Th. Fr.) Stein (**25**, p. 101). BERGEN: Allendale, Bear Swamp Pond, Darlington, Franklin Mills, Saddle River (*Mrs. Dunham,* 1939), and Waldwick. ESSEX: North Caldwell. HUNTERDON: Bissell, Oldwick, and Silver Hill. MERCER: Mt. Rose. MORRIS: Green Village, Mt. Freedom, New Vernon, Oak Ridge, and Stirling. OCEAN: Island Beach (*Dix,* 1939), Lakewood (*Dix,* 1939), and Sim's Place. PASSAIC: Hewitt and Stonetown. SOMERSET: Warrenville. SUSSEX: Andover, Colesville, and Kittatinny Mountain. WARREN: White Lake near Marksboro (1938).

27b.* CLADONIA VERTICILLATA f. AGGREGATA (Del.) Oliv. (**6**, p. 50). BERGEN: Allendale, Franklin Mills, and Hohokus (1938, det. Sandstede). MORRIS: Green Village. SUSSEX: Andover and Kittatinny Mountain.

27c.* CLADONIA VERTICILLATA f. APOTICTA (Ach.) Vainio (**4**, p. 460). BERGEN: Darlington and Ridgewood (1938). ESSEX: North Caldwell. HUNTERDON: Oldwick.

27d.* CLADONIA VERTICILLATA f. PHYLLOCEPHALA (Flot.) Oliv. (**4**, p. 461). UNION: Mountainside.

28. CLADONIA CALYCANTHA Del. (**25**, p. 101). BERGEN: Franklin Mills. BURLINGTON: Red Lion (*Dix,* 1939). HUNTERDON: Oldwick. MONMOUTH: Cranberry Hill. OCEAN: Forked River. PASSAIC: Haskell. SALEM: Centerton. WARREN: White Lake near Marksboro (1938).

28a. CLADONIA CALYCANTHA f. FOLIOSA Vainio (**25**, p. 103). BERGEN: Franklin Mills. BURLINGTON: near Red Lion (*Dix,* 1939). OCEAN: Forked River. WARREN: White Lake near Marksboro (1938).

28A. CLADONIA MATEOCYATHA Robbins (**33**, p. 147). BERGEN: Darlington and Emerson (1938). These records are based on specimens with poorly developed podetia.

29aa. CLADONIA PYXIDATA (L.) Hoffm. var. NEGLECTA (Floerke) Mass. f. SIMPLEX (Ach.) Harm. (**25**, p. 103). SUSSEX: Andover, Colesville, and Ogdensburg.

30. CLADONIA CHLOROPHAEA (Floerke) Spreng. (**25**, p. 104). BERGEN: Allendale, Bear Swamp Pond, Closter, Emerson (1938), Franklin Mills, Hackensack (1938), near Mahwah (1938), Ridgewood (1938), Upper Saddle River, and Waldwick. BURLINGTON: Martha. ESSEX: Cedar Grove and North Caldwell. HUNTERDON: Bissell. MONMOUTH: Cranberry Hill. MORRIS: Green Village, Littleton, and Waughaw Mountain. OCEAN: Forked River, Island Beach (*Dix,* 1939), Lakewood (*Dix,* 1939), and Sim's Place. PASSAIC: Hewitt, High Mountain near Haledon, and Mountain Glen Lakes near Upper Macopin. SUSSEX: Hamburg Mountain and Ogdensburg. UNION: Seely's Glen. WARREN: White Lake near Marksboro (1938). These specimens are either mixtures of various forms or indefinite as to form.

30b. CLADONIA CHLOROPHAEA f. SIMPLEX (Hoffm.) Arn. (**33**, p. 147). BERGEN: Darlington, Emerson (1938), Franklin Lake and Mills, near Mahwah (1938), Paramus (1938), and Washington. BURLINGTON: Martha (1938). HUNTERDON: Mountainville. MONMOUTH: near Asbury Park (*Evans,* 1939). MORRIS: Mt. Freedom. PASSAIC: Haskell, Monks, and Stonetown. SALEM: Elmer. SOMERSET: Lyons. SUSSEX: Andover, Colesville, and Franklin. UNION: Mountainside. WARREN: Lookout Rock near Pequest (1938).

30c. CLADONIA CHLOROPHAEA f. CARPOPHORA (Floerke) Anders (**33**, p. 147). BERGEN: Emerson (1938).

30d.* CLADONIA CHLOROPHAEA f. CONISTEA Del. (**26**, p. 18). BERGEN: Franklin Mills and Waldwick. BURLINGTON: Martha (*Nearing & Small,* 1939). HUNTERDON: Oldwick.

30e.* CLADONIA CHLOROPHAEA f. PTERYGOTA (Floerke) Vainio (**4**, p. 470). BURLINGTON: Martha (1938, det. Sandstede).

30f.* Cladonia chlorophaea f. lepidophora (Floerke) Sandst. (**4**, p. 471). Ocean: Forked River.

31. Cladonia grayi Merrill (**25**, p. 104). Listed from New Jersey by Sandstede (**35**, p. 90). Bergen: Allendale, Bear Swamp Pond, Emerson (1938), Franklin Lake and Mills, Hillsdale (1938), Hohokus (1938), near Mahwah (1938), Waldwick, Washington, and Wyckoff. Burlington: Atsion (1938). Essex: Cedar Grove. Gloucester: Bridgeport and Mullica Hill. Hunterdon: Oldwick and Rileyville. Mercer: near Hopewell (*Dix,* 1939), Mt. Rose, and Trenton (*Dix,* 1939). Middlesex: Menlo Park. Monmouth: Ardena, Morganville, and Spring Valley. Morris: Great Swamp near Mt. Vernon, Green Village, Hanover Neck, Mt. Freedom, New Vernon, Oak Ridge, and Waughaw Mountain. Ocean: Lakewood, Pasadena, and Sim's Place. Passaic: Franklin Notch (1938), Goffle Ridge near Haledon, Hewitt (*Nearing & Thomson,* 1939), and Monks. Salem: Centerton, Elmer, and Norma. Somerset: Lyons and North Plainfield. Sussex: Andover, Colesville, and south of Lake Hartung Road (1938). Union: Mountainside. The specimens upon which these records are based are mostly indefinite as to form.

31a. Cladonia grayi f. simplex Robbins (**33**, p. 148). Bergen: Closter, Darlington, Mahwah (1938), Maywood (1938), Paramus (1938), Ridgewood (1938), Saddle River (1938), and Upper Saddle River (1938). Burlington: Green Bank (1938) and Quaker Bridge (1938). Essex: North Caldwell. Middlesex: Old Bridge and South River. Mercer: near Hopewell (*Dix,* 1939) and Trenton (*Dix,* 1939). Monmouth: Cranberry Hill and Spring Valley. Morris: Green Village, Littleton, and Stirling. Ocean: Pasadena. Passaic: High Mountain near Haledon and Haskell. Somerset: Lamington. Union: Fanwood and Seely's Glen.

31b. Cladonia grayi f. carpophora Evans (**33**, p. 148). Bergen: Darlington and Hohokus (1938). Burlington: Brown's Mills (*Dix,* 1939), Jenkins (1938), and Vincentown (*Dix,* 1939). Cumberland: Vineland. Essex: North Caldwell. Mercer: Pennington (*Dix,* 1939). Monmouth: Spring Valley. Morris: south of Charlotteburg (1938), Green Village and Littleton. Ocean: Island Beach (*Dix,* 1939). Passaic: High Mountain near Haledon. Somerset: Lamington and Warrenville. A specimen of this form

collected by Torrey at Green Pond, Morris County (see **33**, p. 148), has been figured by Sandstede (**34**, *pl. 16, f. 7*).

31c. Cladonia grayi f. squamulosa Sandst. (**33**, p. 148). Bergen: Darlington, Franklin Lake, and Saddle River (*Mrs. Dunham,* 1939). Hunterdon: Sourland Mountain (*Dix,* 1939). Mercer: Hopewell (*Dix,* 1939) and Sourland Mountain (*Dix,* 1939). Morris: Hanover Neck and Oak Ridge. Ocean: Lakewood (*Dix,* 1939).

31Aa. Cladonia conista (Ach.) Robbins f. simplex Robbins (**33**, p. 148). Bergen: Allendale, Bear Swamp Pond, Closter, Darlington, Mahwah (1938), and Wyckoff. Essex: North Caldwell. Hunterdon: Bissell and Ringoes. Mercer: Dutch Neck. Morris: Green Village, Littleton, Meyersville, and New Vernon. Ocean: Sim's Place. Passaic: Mountain Glen Lakes near Upper Macopin. Somerset: Lamington. Sussex: Colesville and Hamburg Mountain. Union: Fanwood.

32. Cladonia fimbriata (L.) Fr. (**25**, p. 104). Bergen: Wyckoff. Ocean: Lakewood.

33. Cladonia nemoxyna (Ach.) Nyl. (**25**, p. 105). Bergen: Allendale, Closter, Darlington, Franklin Lake and Mills, Hohokus (1938), Mahwah (1938), and Wyckoff. Burlington: Martha (1938) and Green Bank (1938, det. Sandstede). Essex: North Caldwell. Hunterdon: Bissell and Rileyville. Mercer: near Hopewell (*Dix,* 1939), Mt. Rose, and Sourland Mountain (*Dix,* 1939). Monmouth: Cranberry Hill and Spring Valley. Morris: Littleton and Mt. Freedom. Ocean: Forked River (*Cohn,* 1937) and Lakewood. Passaic: High Mountain near Haledon and Hewitt (*Thomson,* 1939). Sussex: Andover (*Dix,* 1939), Kittatinny Mountain and south of Lake Hartung Road (1938). Warren: White Lake near Marksboro (1938) and Pequest (1938).

33a. Cladonia nemoxyna f. fibula (Ach.) Vainio (**25**, p. 105). Ocean: Lakewood.

33b.* Cladonia nemoxyna f. rei (Schaer.) Anders (**26**, p. 23). Mercer: Sourland Mountain (*Dix,* 1939, the earliest New Jersey record). Ocean: Lakewood.

34. Cladonia ochrochlora Floerke (**25**, p. 105). Sussex: Kittatinny Mountain.

35. Cladonia coniocraea (Floerke) Spreng. (**25**, p. 105). Bergen: Alpine and Franklin Lake. Middlesex: Matuchin. Passaic: Franklin Clove and Haskell. These specimens are poorly developed and indefinite as to form.

35a. Cladonia coniocraea f. ceratodes (Floerke) Dalla Torre & Sarnth. (**25**, p. 105). Bergen: Alpine, Bear Swamp Pond, Darlington, Hillsdale (1938), Hohokus (1938), Mahwah (1938), Paramus (1938), Rochelle Park (1938), Saddle River (1938), Waldwick, Washington, and Wyckoff. Burlington: Atsion (1938) and Martha (1938). Essex: North Caldwell and South Mountain Reservation (1938). Hunterdon: Bissell and Rileyville. Middlesex: Old Bridge and Rhode Hall. Monmouth: Ardena, Cranberry Hill, and Spring Valley. Morris: Great Swamp near Mt. Vernon, Green Village, Meyersville, Mt. Freedom, New Vernon, Oak Ridge, and Waughaw Mountain. Ocean: Lakewood and Laurelton. Passaic: Franklin Notch, Goffle Ridge (1938) and High Mountain near Haledon, Haskell, Hewitt (*Nearing & Thomson,* 1939), Monks, Mountain Glen Lakes near Upper Macopin, and Stonetown. Salem: Centerton and Elmer. Sussex: Colesville, Hamburg Mountain, and south of Lake Hartung Road (1938). Union: Fanwood, Mountainside, and Seely's Glen. Warren: Lookout Rock near Pequest (1938).

35b. Cladonia coniocraea f. truncata (Floerke) Dalla Torre & Sarnth. (**25**, p. 105). Bergen: Bear Swamp Pond, Darlington, and Waldwick. Burlington: Martha (1938). Morris: Great Swamp near Mt. Vernon, Mt. Freedom, and New Vernon. Ocean: Lakewood. Passaic: Franklin Notch (1938), Haskell, and Mountain Glen Lakes near Upper Macopin. Sussex: Rock View near Montague.

35c. Cladonia coniocraea f. pycnotheliza (Nyl.) Vainio (**25**, p. 106). Sussex: Kittatinny Mountain.

35d.* Cladonia coniocraea f. expansa (Floerke) Sandst. (**5**, p. 160). Hunterdon: Rileyville. Mercer: Dutch Neck. Monmouth: Ardena. Passaic: High Mountain near Haledon (det. Sandst.).

35e.* Cladonia coniocraea f. phyllostrota (Floerke) Vainio (**4**, p. 481). Bergen: Franklin Mills. Sussex: Kittatinny Mountain.

35f.* Cladonia coniocraea f. robustior (Harm.) Sandst. (**5**, p. 161). Bergen: Closter. Union: Fanwood.

35g.* Cladonia coniocraea f. stenoscypha (Stuckenberg) Sandst. (**26**, p. 24). Somerset: Lamington. Sussex: Hamburg Mountain.

36. Cladonia borbonica (Del.) Nyl. (**25**, p. 106). Cited from New Jersey by Sandstede (**36**, p. 94) under the name *C. fimbriata* var. *borbonica* (Del.) Vainio.

36a. Cladonia borbonica f. cylindrica Evans (**25**, p. 106). Bergen: Allendale, Bear Swamp Pond, Franklin Lake and Mills, Ridgewood (1938), Saddle River (1938), and Upper Saddle River (1938). Essex: North Caldwell. Hunterdon: Bissell, Mountainville, Rileyville, and Ringoes. Middlesex: Rhode Hall. Monmouth: Cranberry Hill. Morris: Great Swamp near Mt. Vernon, Green Village, Meyersville, Mt. Freedom, New Vernon, Oak Ridge, and Waughaw Mountain. Passaic: Haskell, High Mountain near Haledon, Mountain Glen Lakes near Upper Macopin, and Stonetown. Salem: Elmer. Sussex: Colesville, Hamburg Mountain, Kittatinny Mountain, Ogdensburg, and Rock View near Montague. Union: Seely's Glen.

37aa. Cladonia pityrea (Floerke) Fr. var. zwackhii Vainio f. subacuta Vainio (**25**, p. 106). Bergen: Bear Swamp Pond, Darlington, and Washington. Monmouth: Cranberry Hill. Morris: Great Swamp near Mt. Vernon. Passaic: Haskell, High Mountain near Haledon and Hewitt (*Thomson,* 1939). Sussex: Hamburg Mountain and Kittatinny Mountain.

37ab.* Cladonia pityrea var. zwackhii f. squamulifera Vainio (**4**, p. 485). Bergen: Hohokus (1938). Salem: Elmer. Passaic: Haskell.

Group 3. Foliosae

38. Cladonia strepsilis (Ach.) Vainio (**25**, p. 106). Bergen: Allendale, Bear Swamp Pond, Darlington, Emerson (1938), Franklin Mills, Ridgewood (1938), Washington, and Wyckoff. Burlington: Martha (1938) and near Red Lion (*Dix,* 1939). Essex: North Caldwell. Middlesex: Rhode Hall and South River. Ocean: Lakewood and Laurelton. Passaic: Hewitt. Somerset: Lamington, Lyons, and North Plainfield. Sussex: Kittatinny

Mountain. The specimens upon which these records are based are composed largely or wholly of primary squamules.

38a. CLADONIA STREPSILIS f. GLABRATA Vainio (**25**, p. 106). BERGEN: Emerson (1938) and Paramus (1938). OCEAN: Pasadena. PASSAIC: Franklin Notch (1938).

38b. CLADONIA STREPSILIS f. CORALLOIDEA (Ach.) Vainio (**25**, p. 106). BERGEN: Allendale, Closter, Franklin Lake, Mahwah (1938), Paramus (1938), and Washington. GLOUCESTER: Mullica Hill. MONMOUTH: Cranberry Hill. OCEAN: Pasadena. UNION: Seely's Glen.

38c. CLADONIA STREPSILIS f. SUBSESSILIS Vainio (**25**, p. 107). BERGEN: Emerson (1938) and Paramus (1938). CUMBERLAND: Vineland. MONMOUTH: Morganville. OCEAN: Forked River. PASSAIC: Haskell. UNION: Seely's Glen.

Group 4. OCHROLEUCAE

39. CLADONIA PIEDMONTENSIS Merrill (**25**, p. 107). MORRIS: Green Village. This material is indefinite as to form.

39a. CLADONIA PIEDMONTENSIS f. LEPIDIFERA (Vainio) Robbins (**25**, p. 107). BERGEN: Franklin Lake and Mills and Wyckoff. MERCER: Hopewell (*Dix*, 1939). SOMERSET: Warrenville.

39c. CLADONIA PIEDMONTENSIS f. SQUAMULOSA Robbins (**25**, p. 107). BERGEN: Franklin Mills. MORRIS: New Vernon. SOMERSET: Warrenville.

Collections of *Cladoniae* have now been made in all the counties of New Jersey except the densely populated Hudson County. According to the available records some of the counties are rich in species, whereas others are comparatively poor. This discrepancy is partly due to the fact that certain counties have been more carefully explored than others; but it must also be kept in mind that certain parts of the state afford more favorable conditions than others for the development of a *Cladonia* flora. The pine barren region, for example, with its extensive areas of exposed, uncultivated land, is far better adapted for the growth of *Cladoniae* than a region covered with farms, orchards, and forests.

It is not surprising, therefore, that Ocean County, with 40 species to its credit, stands at the head of the list. Bergen County, however, with 35 species, is a close second, and each of the fol-

lowing counties has more than 25 species: Sussex, 33; Passaic, 31; Burlington and Morris, 28 apiece. The counties at the other end of the series, each with fewer than 15 species, are the following: Middlesex and Cape May, 14 apiece; Salem, 13; Gloucester, 12; and Camden, 7. It will be seen that these include some of the most intensively cultivated areas in the state.

From the standpoint of local distribution *C. cristatella* and *C. squamosa* seem to be the commonest species and are known from 19 counties each. These are followed by *C. tenuis,* known from 18 counties; *C. bacillaris, C. grayi,* and *C. mitrula,* from 17 each; and *C. coniocraea,* from 16. Each of the following species, however, is known from a single county: *C. brevis, C. gracilis, C. impexa, C. nanodes, C. ravenelii,* and *C. turgida.* Other species with a restricted distribution, according to our present information, are as follows: *C. boryi, C. fimbriata, C. mateocyatha, C. ochrochlora,* and *C. vulcanica,* known from 2 counties each; *C. didyma* and *C. pyxidata,* from 3 each; and *C. floridana, C. piedmontensis,* and *C. santensis,* from 4 each.

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Notes on Washington Plants

W. C. Muenscher

Since the appearance of that monumental work of its time, "Flora of the State of Washington," by Piper (1), a number of species have been added to the known flora of Washington. Many of these subsequent discoveries were incorporated in floras by Piper and Beattie (2, 3) covering the southeastern and western parts of the state. More recently St. John, in a revision (4), has added other species from southeastern Washington. Jones, in two local catalogues covering the Olympic Peninsula (5) and Mount Rainier (6), has contributed other species not previously reported from Washington.

The following list contains forty species apparently not previously reported from Washington State. It is possible that some of these may have been previously reported in monographs or brief papers on local areas, at least they do not occur in the publications mentioned above. Unless indicated otherwise, the specimens were collected in Whatcom County by the writer and are deposited in the herbarium of Cornell University.

Gramineae

Setaria verticillata Beauv. An introduced weed in gardens and fields in the Nooksack River Valley.

Pontederiaceae

Heteranthera dubia (Jacq.) MacM. Abundant in 1 to 2 meters of water in Silver Lake. The gall-forming organism, *Sorodiscus Heterantherae* Wernham, was found on the roots and stem bases of this aquatic plant. Although the host has been reported from eastern Washington, this is the first record of *Sorodiscus Heterantherae* from west of New York.

Salicaceae

Salix alba L. var. *vitellina* (L.) Koch. Established on the lowlands near the mouth of the Nooksack River.

Salix purpurea L. Established along streams and ditches; Marietta; Squalicum Lake.

Polygonaceae

Polygonum Sachalinense Schm. Established in waste places and along roadsides near Bellingham. Introduced from the Orient and frequently planted as an ornamental.

Polygonum scabrum Moench. A weed in gardens and about farmyards near Lynden.

Rumex Acetosa L. Introduced and grown in gardens for "greens." Established in wet meadows near Ferndale.

Caryophyllaceae

Dianthus deltoides L. Established on grassy banks; Bellingham; Skagit River Valley.

Dianthus barbatus L. Established on dry grasslands; Blaine; Marietta.

Nymphaeaceae

Nymphaea tetragona Georgi subsp. *Leibergi* (Morong) Porsild. In sluggish stream and pond near Ferndale.

Nymphaea tuberosa Paine. Infrequent in Squalicum Lake; probably introduced.

Fumariaceae

Fumaria officinalis L. A weed in fields of peas and vetch; Lummi Island.

Cruciferae

Erucastrum gallicum Schulz. A weed of waste ground and along railroad tracks in South Bellingham; probably recently introduced with grain from farther east.

Euclidium syriacum (L.) R.Br. A low spreading weed about a farmyard and along a driveway in an orchard, Naches Heights, Yakima County. According to Dr. R. T. Clausen, who kindly made the determination, this native of Central Europe appears not to have been reported before from the United States.

Lunaria annua L. Escaped on waste banks along Bellingham Bay.

Crassulaceae

Sedum acre L. Established in many localities on dry sandy or gravelly soil; Marietta, Semiahmoo, Lynden, Bellingham.

Sedum triphyllum S. F. Gray. Established in grasslands near Lynden.

Saxifragaceae

Saxifraga saximontana E. Nels. On rocky slopes in alpine meadows of the Cascade Mountains in Whatcom and Okanogan Counties.

Rosaceae

Potentilla emarginata Pursh. On rocky ledges above timber line on Skyline Ridge.

Linaceae

Linum micranthum Gray. On dry grassy bank, Bellingham, *A. R. Roos.*

Oxalidaceae

Oxalis europaea Jord. Escaped from gardens and established on waste places in several places in Whatcom County.

Geraniaceae

Geranium Robertianum L. Introduced and established along the edge of a wooded pasture near Sumas.

Euphorbiaceae

Euphorbia Helioscopia L. On sandy soil in gardens and along roadside, Chuckanut Bay.

Balsaminaceae

Impatiens Roylei Walp. Established on spring-fed, shaded slopes south of Bellingham.

Boraginaceae

Symphytum asperum Lep. Established in grasslands on dry gravelly soil; Blaine; Kendall.

Labiatae

Galeopsis Tetrahit L. Established and widespread along fence rows and edges of woods; Ten Mile; Sumas; Baker Lake.

Lamium maculatum L. Escaped from cultivation to partially shaded banks; Ten Mile; Stetattle Creek.

Solanaceae

Lycium halimifolium Mill. Established on sandy banks; Point Roberts; Marietta.

Scrophulariaceae

Linaria macedonica Griseb. Established in dry gravelly soil near Kendall, Whatcom County; a weed near Kittitas, Kittitas County, *A. R. Kirk,* 1939.

Veronica hederifolia L. Established on grassy slopes in the Snake River Canyon near Almota, Whitman County.

Valerinaceae

Valeriana officinalis L. Established along roadside near Lynden.

Cucurbitaceae

Echinocystis lobata T. and G. Established along fence rows and in waste places; Sumas; Wiser Lake; Lynden.

Campanulaceae

Campanula rapunculoides L. Established in grasslands along roadsides and fences near Custer.

Compositae

Artemisia caudata Michx. In sandy soil along beach; Blaine; Point Roberts.

Centaurea maculosa Lam. Becoming widespread in grasslands on dry gravelly soil in Whatcom County.

Centaurea diffusa Lam. A spreading weed, along roadside ditches and in fields near Twisp, Okanogan County.

Cirsium arvense (L.) Scop. var. *mitis* Wimm and Grab. A weed in waste places, Bellingham.

Helianthus tuberosus L. Established in waste places; Bellingham; Kendall.

Hieracium aurantiacum L. This European weed which has become so troublesome in pastures in the northeastern United States has been introduced into rock gardens in western Washington. During the last ten years it has been passed around until it has spread by seed from rock gardens and has become established in grasslands in several places in Whatcom County.

Lactuca canadensis L. In gravelly grasslands and open woodlands near Kendall; apparently introduced.

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BOOK REVIEWS

A new edition of a standard manual*

George T. Hastings

When Rehder's Manual of Cultivated Trees and Shrubs appeared in 1927 it became almost at once a standard work essential to everyone working with woody plants in the United States. In the years since its publication new plants have been introduced, new varieties and hybrids have been developed, some changes in names have been necessitated by amendments to the International Rules of Botanical Nomenclature, and critical study of species has resulted in changes. All these are incorporated in the new edition, bringing the Manual up to date. Some 200 more species are added, with a corresponding increase in the number of varieties and hybrids. The map showing zones of hardiness, too small to be used conveniently, has been redrawn and printed in two colors as a full page plate. Seven instead of eight zones are recognized, but the reduction is practically to six zones as I, the treeless area of

* Manual of Cultivated Trees and Shrubs. Second Edition, Alfred Rehder. xxx + 996 pages. The Macmillan Company. 1940. $10.50.

northern Canada, and II, covering most of the rest of Canada, were both largely included in zone I of the first edition. Zone VII, the southernmost from which plants are considered, does not extend quite as far south as zone VIII of the first edition, as a result a few southern plants (including the only palm) given in the earlier edition are omitted. Plants that will not grow north of South Carolina or Louisiana in the east, or central California in the west are not included, otherwise all woody plants native or introduced to North America are given. It is interesting to note, as in the first edition, the number of varieties recognized for common native trees, as a random sampling—three varieties of the Quaking Aspen (*Populus tremuloides*), six of the Black Cherry (*Prunus serotina*), five of the Sugar Maple (*Acer saccharum*), four and three hybrids of the American Basswood (*Tilia americana*) and four of the Flowering Dogwood (*Cornus florida*). The term shrub is made to include such small forms as Spotted Wintergreen, Pipsissewa, Trailing Arbutus, Periwinkle and Linnaea. Moss Pink (*Phlox subulata*), given in the first edition, is omitted as is *Gilia pungens* for which *Gilia californica* is substituted.

Most of the work, as would be expected, is little changed; but the Bamboos have been entirely rewritten with ten instead of three genera—the result of recent study which has greatly divided Arundinaria as well as some of the other genera. The genus Rosa has been rewritten, with four instead of two subgenera and fewer sections, but the species little changed. Rhododendron has also been rewritten, eighty-five instead of sixty-one species being described. The treatment of species and genera is conservative—the Chokecherry is still *Prunus;* Cranberry, *Vaccinium;* and Box-Elder, *Acer.* But it is hard to reconcile with this conservative attitude the dividing of the genus Sequoia, the big tree becoming *Sequoiadendron giganteum.*

As in the early edition there are complete keys to families, genera and species. The list of publications with illustrations of described species has been enlarged and the list of authors has been increased to include all the names cited, about 1,150. A total of 2,550 species are described. The index, which includes all the varieties and synonyms, lists 14,300 names. This new edition at once goes on the "must have" list of all workers with cultivated woody plants.

Jones's Introduction to Floral Mechanism*

Joseph Ewan

There is a scarcity of recent literature available in English upon angiosperm morphology. The best known source-book, which still remains the classic though practically unobtainable, is Coulter and Chamberlain's *Morphology of Angiosperms.* Recent synoptical reviews such as that of Wilson and Just in *Botanical Review* have marked out the more recent controversies and literature. But it is an event to welcome the present text in this field. The book is the outgrowth of the need for a text for "first-year university students" at the University of Glasgow.

The book is divided into two parts. Part One consists of general, often too sketchy, discussions and definitions of such essential considerations in the field as "The Flower," "Floral Construction and Symmetry," "Pollination," "Heredity and Evolution" and many others, extending over 143 pages. This section might advantageously be recast in a future edition, elaborating upon the fundamentals, such as the "Development of Flower" and "Fertilization," and eliminating entirely such discussions as the "Mechanism of Inheritance" and "Hybridization and Improvement of Cultivated Plants"—topics which do not properly come under the major subject of the book.

The second portion of this text, which represents the more important contribution to the field of floral morphology, covers twenty-one selected families of angiosperms familiar to students of courses in "Local Flora." The number of clear and well-reproduced zinco cuts throughout the text will attract the reader at once. These figures, often full page and illustrating plant species little featured in the literature, will prove especially useful in courses in systematic botany. The drawings of *Silene inflata, Lychnis dioica, Ulex europaeus, Anthriscus sylvestris, Veronica Chamaedrys,* and *Orchis maculata* are welcome additions to our teaching materials. The figures are often badly crowded and poorly placed on the page. It does not seem to be realized that figures may be cut apart and reoriented though crowded on the original bristolboards by the artist. If this is done before the cuts are made the results on the final pages will amply repay the effort. The legends for the figures are espe-

* Introduction to Floral Mechanism. S. G. Jones. xi + 274 pp. Chemical Publishing Co. of New York, Inc. 1939. $4.00.

cially full and useful; often cautionary statements are made to help the student over difficult spots. Figures 70 and 71 are almost theatrical in their instant impression, so strikingly do they portray the floral parts of *Orchis maculata.* It is unfortunate, however, that apparently all the figures lack an indication of the amount of enlargement.

Another feature of the book is the uniform treatment of the species selected for demonstration of floral mechanism. Thus the "habit, inflorescence, flower, calyx, corolla, androecium, gynoecium, pollination, and fruit" characters are given for each species treated.

The chart on page 151 suggests a phylogeny for the plant families treated in this book but such a suggestion is misleading both for the enormous gaps in the series chosen of the total plant families, indicating positions as it does for not one-thirteenth of the world's families, and even for the arrangement of the twenty-one families placed on the chart. Thus it is implied that the Caryophyllaceae are more "advanced" than the Violaceae, a fact ill supported by the morphology of these two families.

There is a one-page skeleton bibliography of sources well known to students of floral morphology, though there are omissions of such fundamental sources as the Coulter and Chamberlain volume hereinbefore mentioned. The three-page glossary is inadequate. Apomixis is too narrowly defined; cotyledon is scarcely defined at all. There is a good index.

Beyond the details mentioned in this review which detract from the book there remains a useful text which will ably serve as a handbook for use in courses in angiosperm morphology and systematics. It is hoped that the author will be able to rearrange the materials, with some elimination of extraneous topics, in an extended future edition that will save for us all the fine features of the present book. Meanwhile, its usefulness will prove its greatest compliment.

Methods and Materials for Teaching Science*

Ralph C. Benedict

Throughout the centuries, since men have tried to approach the objective world in a spirit of pure enquiry, there have always been

* Modern Methods and Materials for Teaching Science. Heiss, E. D., Osbourn, E. S., and Hoffman, C. W. Pp. 351. The Macmillan Co. $2.50. 1940.

those who have sought, not only to follow the road of research themselves, but also to incite others to use similar methods; to approach the unknown in an unprejudiced, open-minded manner. Formerly, such teachers were lone individuals who might leave behind a few disciples to carry on their teaching tradition. Within the last few decades, however, during which the numbers of students in science classes has multiplied thousands of percent, there has come an increasing recognition of the potential value of science teaching as a possible medium for training in habits of thought and in attitudes of mind. To some extent, this trend has been marked by a deal of visionary and wishful thinking; the differences between what would be ideal and what might be practical and possible has been overlooked; wagons have been hitched to stars without any means of traction. Gradually, however, common sense has begun to catch up with inspiration, and pedagogical literature today includes an increasing number of pages of discriminating analysis and stimulating, useful suggestion.

The Heiss, Osbourn, and Hoffman text, "Modern methods and materials for teaching science," definitely belongs in this class. With the declared purposes (1) "to be a textbook for those courses in the methods of teaching science which are now being given in many colleges and universities; (2) to be a source book of information for those teachers of science, at whatever level they may be working, who wish to keep up with modern trends in the teaching of science," this should prove a useful introduction to the subject as it stands at present. For the experienced biology teacher, its chief value will be found in the introductory part in which the writers explore the general principles of science education; the detailed suggestions of the other parts can necessarily be only sketchy so far as any single science is concerned, but the bibliography at the back of the book can furnish plenty of additional sources relating to specific sciences.

The text is presented in three sections as follows: (1) Principles of science teaching; (2) Materials and devices for teaching science; (3) Sources of materials for teaching science.

FIELD TRIPS OF THE CLUB

Trip of April 21 to the Bartlett Tree Research Laboratories

In spite of the extremely inclement weather, several hardy members of the Club and their guests enjoyed an interesting and profitable day at the Bartlett Tree Research Laboratories, where Dr. Stanley W. Bromley, assistant entomologist of the laboratories' staff, was our genial host and guide. Most of the time was spent indoors in an examination of hundreds of specimens of local insects in all stages and a collection of bark, limbs, and twigs showing the various types of injury by different insects to native and cultivated trees and shrubs. Dr. Bromley answered a multitude of questions on methods of insect pest and fungous disease control and explained the work which has been done on such important diseases as the chestnut blight and Dutch elm disease, including a fascinating exposition of the spread of the latter as explained by local air currents which carry the disease-bearing beetles in the same manner as they were made to carry experimental balloons. A most valuable and beautiful collection of paper-thin sections of the wood of several hundred trees and shrubs was examined. Dr. Bromley illustrated the effects of the 1939 hurricane in this area and allowed us to examine branches taken from oak trees after the hurricane, on which the leaves had actually been knotted together! This curious and at first almost unbelievable effect had been produced by the wind twirling the leaves so continuously that only the fibro-vascular bundles were left in the petioles. The large and practically intact blades were then wrapped about each other by the wind, causing the fibrous "petioles" in some cases actually to become braided or knotted.

Harold N. Moldenke

Trip of April 28 to Bushkill Falls, Pa.

Some forty members and guests of the Torrey Botanical Club met on the morning of April 28 at Bushkill Falls, Pa., to study the bryophytes of that area. When the group assembled, however, it was evident that with the help of the specialists who had come, the observations would not have to be limited to these plants. All of us profited greatly through the generous cooperation of the Chairman of the Field Committee, Dr. Small, and of Mr. Nearing, Dr.

Higinbotham, Dr. Thomson, and other members who were present and contributed. Mr. Nearing reported good lichen collecting.

Abundant water tumbling over the falls makes a cloud of spray which gives attractive rainbow effects and at the same time bathes the steep slopes of the opposite side of the gorge in a perpetual blanket of cool mist. This limited area, and this alone, supports a luxuriant growth of *Hylocomnium proliferum,* associated with the gold-thread, *Coptis trifolia,* suggesting a bit of the cold north woods. On the sides of this gorge, both above and below the falls, the liverwort *Reboulia hemisphaerica* flourishes, together with such mosses as *Aulacomnium palustre,* the apple-moss *Bartramia pomiformis,* the fern moss *Thuidium delicatulum,* as well as many others. Ebony and maidenhair spleenworts are tucked securely in the crevices.

The morning was spent mostly in the rather moist ground above the falls. *Rhodobryum roseum* grows abundantly there, while *Mnium punctatum* var. *elatum* and *Mnium hornum* reach unusually large size. In the drier places *Tortella* can be found, while *Hedwigia albicans* grows on the stones. *Thelia hirtella* is wrapped about the bases of the trees, and the tiny liverwort *Frullania eboracensis* traces cryptic writings higher up on the trunks. A growth of the giant water moss, *Fontinalis gigantea,* that had been left carefully uncollected a year ago, in a small brook, did not fail us; close by, its less corpulent cousin, *Fontinalis dalecarlica,* is abundant.

In the early afternoon the members of the group wandered slowly down through the gorge and past the falls, studying the bryophytes especially. Somewhat later, those who had a full day at their disposal left the beaten paths and scrambled up over the rocky cliffs, where the early saxifrage was wasting its sweetness in profusion, and then continued up along a second stream, with its own smaller gorge and falls. Collecting is permitted there, and most of our characteristic liverworts, such as *Pellia, Pallavicinia, Porella, Ptilidium, Trichocolea,* and many others, can be found. A soggy area, resulting from a spring in the side of a hill, supports a luxuriant growth of *Marchantia polymorpha,* which showed male and female receptacles abundantly developed. This plant is associated here with *Sphagnum.*

Buxbaumia aphylla, with young sporophytes, could be found on the hillsides by anyone humble enough to get down on his knees and search for it.

It is good to get out and associate with these plants for a day occasionally—good even for a scientist.

EDWIN B. MATZKE

TRIP OF MAY 25 TO PLAINFIELD AND WATCHUNG, N. J.

Because of the rainy weather, this trip was conducted in a somewhat different fashion from any previous year. The party botanized the entire distance from the railroad station in Plainfield, through North Plainfield and Watchung, to the home of the leader. Several hundred plants were identified along this course, including first the cultivated plants in gardens along the city streets and the weeds found along the sidewalks, then the ruderal plants along the open highways (mostly European introductions), and finally the native plants of thickets, woods, open field, and marshes in Washington Valley. Splendid examples of ecologic succession were pointed out. One of these was the common invasion of open fields, formerly used as pastures, but now no longer grazed, by red cedars, gray birches, northern bayberry, maleberry, and several species of huckleberry and blueberry, and the gradual advance of the deciduous oak-maple-hickory forest down the mountain slopes into the fields after they were thus invaded by the "pioneer" plants which provided the shade in which the tree seedlings could grow. Another was the transition of a plot of ground which had been cleared and cultivated by an early settler, then invaded by the Jerusalem artichoke until a pure stand of this species covered the entire lot, and finally having the artichokes driven out and completely replaced by native goldenrods and asters. Large numbers of Morrow's bush-honeysuckle and ibota privet were found along fences and hedgerows where they had been "planted" by birds. In Wetumpka Notch the sugar maple, Canada hemlock, rock polypody, and green ash were observed with interest. The cuckoo-flower was found still in anthesis. Several colonies of the freak smooth sumac, *Rhus glabra* f. *abludens,* were pointed out. The afternoon was spent, between showers, in studying some of the woodland, meadow, and brookside plants, among the most noteworthy of which were the moccasin-flower, showy orchis, northern wild-comfrey, and violet wood-sorrel.

HAROLD N. MOLDENKE

Trip of May 26 to Seeley's Notch

Continued inclement weather was unable to dampen the ardor and enthusiasm of members of the Club and their guests who turned out for this trip in and about the Triassic Watchung hills near Scotch Plains and Fanwood, N. J. The stand of naturalized empress-trees, visited last year, was found to have suffered severe damage due to fire and garbage dumping operations. The whorled pogonias were seen again in all their rare charm and beauty, and, for the first time in this locality, the water violet (*Viola lanceolata*), growing on an open and exposed red-shale talus-slope (!). The whorled loosestrife was in splendid condition and three species of *Aralia* were pointed out—*A. nudicaulis, A. racemosa,* and *A. spinosa* —the first two native, the last one naturalized. The wineberry, *Rubus phoenicolasius,* was found in several spots. The mud-plantain and pondweed, found in such abundance last year on Seeley's Pond, were entirely absent this year, apparently having been exterminated in a W.P.A. "improvement" project. Dame's rocket and the yellow flag were still in abundance along the brook, and, of course, the reed canary-grass. Canada wild-ginger and bishop's-cap covered moist springy ledges near extensive colonies of American bladdernut, early meadow-rue, and Virginia waterleaf. Both the inland hornbeam and the common hop-hornbeam grew along the stream. It was rather surprising to find the northern sour-gum on the very top of the trap-rock cliffs, in company with pinxter-flower, red-berried elder, toothed white-top aster, Carolina dwarf-dandelion, rattlesnake-weed, bastard toadflax, savory-leaf aster, downy-leaf arrow-wood, and the young plants of stout ragged goldenrod. Both the wild-indigo and the common false-indigo were pointed out, as well as large stands of the true water-cress, wood lousewort, and both the smooth and downy false-foxglove. The differentiating characters between the wild and woodland sunflowers at this season and between numerous species of goldenrod, aster, grass, sedge, viburnum, poplar, and bramble were explained. An extensive naturalized planting of red pine was visited and the violet population which was thriving among the fallen pine needles caused considerable comment and speculation regarding what other plants would invade this area in subsequent years. Purple-flowering raspberry, wild columbine, American may-apple, greater celandine, white and sweet-scented bedstraw, cleavers goosegrass, garlic

mustard, common wild-liquorice, Canada wood-nettle, false-nettle, clearweed, paper-mulberry, rough hackberry, Pursh's figwort, American dittany, American trumpet-creeper, bittersweet nightshade, three species of plantain, northern bush-honeysuckle, northern deerberry, yellow pimpernel, heartleaf alexanders, silky and roundleaf cornel, common, thymeleaf, and corn speedwell, Virginia goatsbeard, northern horse-balm, dwarf hawthorn, purple-fruited chokeberry, and scores of other plants came in for considerable attention.

HAROLD N. MOLDENKE

TRIP OF JUNE 9 TO DOCK WATCH HOLLOW AND CHIMNEY ROCK

Thirty-three members and guests were present on this, one of the most successful trips of the season. Over three hundred species and varieties of plants were identified, including *Iris versicolor, Rubus frondosus, R. argutus, Helianthus divaricatus, H. decapetalus, Alsine longifolia, Carex scoparia, C. crinita, C. digitalis, C. cephalophora, C. complanata, Poa compressa, Agrimonia gryposepala, Carya alba, C. glabra, Brachyelytrum erectum,* and *Cynthia virginica.* Two species of ash, *Fraxinus americana* and *F. pennsylvanica,* two species of alexanders, *Zizia aurea* and *Z. cordata,* two species of hawkweed, *Hieracium florentinum* and *H. pratense,* the glaucous honeysuckle (*Lonicera dioica*) and hairy bedstraw (*Galium pilosum*) proved of special interest. *Phlox divaricata* was found in several beautiful stands, and a colony of *P. subulata* hugged a dry and sunny rocky slope. The purple meadow-parsnip (*Thaspium trifoliatum*) was a "new" plant for most of the members present. Seven species never before recorded by the writer from the Watchung area were discovered locally in abundance—the dwarf plantain (*Plantago virginica*), slender plantain (*Plantago pusilla*), black maple (*Saccharodendron nigrum*), curly pondweed (*Potamogeton crispus*), lyre-leaf rock-cress (*Arabis lyrata*), blue scorpion-grass (*Myosotis micrantha*), and field camomile (*Anthemis arvensis*). Other highlights of the trip included the discovery of true ginseng (*Panax quinquefolium*), large twayblade (*Liparis liliifolia*), and Wood's grape-fern (*Botrychium matricariaefolium*). The swamp buttercup (*Ranunculus septentrionalis*) made a spectacular display along the streams, and other noteworthy plants observed and studied included wild columbine (*Aquilegia canadensis*), hooked crowfoot (*Ranunculus recurvatus*), early and fall

meadow-rue (*Thalictrum dioicum* and *T. polygamum*), American may-apple (*Podophyllum peltatum*), moonseed (*Menispermum canadense*), Canada wild-ginger (*Asarum canadense*), sickle-pod (*Arabis canadensis*), field cress (*Lepidium campestre*), Virginia peppergrass (*Lepidium virginicum*), violet wood-sorrel (*Ionoxalis violacea*), dwarf hawthorn (*Crataegus uniflora*), rough hackberry (*Celtis crassifolia*), Canada wood-nettle (*Laportea canadensis*), bastard toadflax (*Comandra umbellata*), honewort (*Cryptotaenia canadensis*), woolly sweet-cicely (*Osmorhiza claytoni*), maleberry (*Arsenococcus ligustrinus*), scarlet horse-gentian (*Triosteum aurantiacum*), northern Venus' looking-glass (*Specularia perfoliata*), Virginia waterleaf (*Hydrophyllum virginianum*), hairy beard-tongue (*Penstemon hirsutus*), one-flowered cancer-root (*Thalesia uniflora*), crisped bunchflower (*Melanthium latifolium*), common yam-root (*Dioscorea paniculata*), and eastern box-elder (*Negundo aceroides*).

HAROLD N. MOLDENKE

WEEK-END TRIP OF JUNE 21 TO 23 AT THE ALLEGANY SCHOOL OF NATURAL HISTORY, QUAKER BRIDGE, N. Y.

A total of eighty naturalists participated in the botanical foray held at the Allegany School of Natural History over the week-end of June 21-23. The following societies were represented: Botanical Society of America, American Society of Plant Taxonomists, Burroughs-Audubon Club of Rochester, Nature Sanctuary Society of Western New York, Southern Appalachian Botanical Club, Torrey Botanical Club, Sullivant Moss Society, Western Pennsylvania Botanical Club.

Those who arrived Friday afternoon enjoyed an excellent supper in the spacious dining room of the Allegany School. The first number on the program was a lecture illustrated with lantern slides by Dr. Wm. N. Fenton of the Bureau of American Ethnology, Smithsonian Institute, Washington, D. C., on "The Ethnobotanical Remains Among the Seneca Nation." This was followed by an illustrated lecture by Mr. A. F. Hough of the Allegheny Forest Experiment Station, Philadelphia, Pa., on "Research Projects in the Allegheny National Forest."

Saturday morning, after an early breakfast the party set off for Jones Hill, under the leadership of Dr. R. B. Gordon, Director of the School. A beautiful drive through the picturesque Alle-

gany State Park, across the Indian Reservation and on to Steamburg, where everybody alighted for the climb. Several pictures were taken of an exceptionally good specimen of *Habenaria orbiculata,* three harmless snakes captured, more than fifty species of birds listed, and scores of plants identified. Jones Hill commands a glorious view over the surrounding plains and hills.

We ate our midday meal at St. Bonaventure College in the medieval atmosphere of a huge refectory. Our monastic hosts then took us on a tour of inspection of their splendid library. This romanesque building houses a modern reading room and special depository for many precious manuscripts, which are guarded against the ravages of time by being kept in optimum moisture and temperature conditions.

In the afternoon there was a foray to Chamberlain's Bog, north of Steamburg, where staminate and pistillate specimens of *Arisaema Stewartsonii* were discovered by Dr. Norman C. Fassett. *Sarracenia purpurea* was found in the bog proper and *Viola tricolor* in an adjoining pasture. The neighboring pastures are fenced with monstrous white pine stumps, which give a weird touch to the peaceful landscape.

Back to the Allegany School for a hearty meal. After dinner there was opportunity to inspect the School grounds, to listen to the Hermit Thrush at Sunset Point nearby or to classical music in the Recreation Cabin, to visit the library and laboratories where the finds of the day were examined and discussed. Some enthusiastic botanists worked on their collections until 2 a.m.

Sunday morning we were confronted with a choice between four attractive forays. The Fern Foray to Sheffield Hill was led by W. Burdett Moose of Coudersport, Pa. Dr. Robert B. Gordon led the Forest Ecologist's Foray to Big Basin; L. K. Henry of the Carnegie Museum collected and identified the numerous fungi. A general Botanical Foray to Bear Bog Uplands was led by Homer Jack, Dr. R. H. Goodwin, Dr. Norman C. Fassett and Dr. Earl E. Sherff. The Lichen and Bryophyte Foray to Rock City, near Olean, N. Y., was led by Dr. Margaret Fulford, Dr. P. Boehner and Mr. Warren Bleeckman.

A last delicious meal at the Allegany School amidst lively talk and general animation was crowned by the closing event of the conference—the presentation of the Pugsley Medal to Prof.

Wm. P. Alexander by Mr. Chauncey J. Hamlin, President of the Buffalo Society of Natural Sciences.

To some of us the conference was a means of discovering the Allegany School of Natural History—an ideal place for the systematic study of nature under expert guidance, where college credits may be earned and independent research pursued in surroundings conducive to greatest accomplishments.

ALEXANDRA KALMYKOW
New York City

TRIP OF JUNE 30 TO MONTAUK POINT

The party spent some time in the swamp near the railroad station and on the neighboring higher ground. The large-bracted vervain, *Verbena bracteata,* a European plant, was found along the path leading to the shore from the lighthouse. The sea-beach poppy, *Glaucium flavum,* was in full bloom and presented a fine sight in the large stand far around on the Sound side of the Point. The tide was coming in and algae found on the rocky coast were literally snatched from the waves. Later, following the shore line around to the Sound side, we found great heaps of algae, mostly *Laminaria.* There was also an abundance of *Corallina, Grinnelia americana, Chondrus crispus* and *Bryopsis plumosa* (a felt-like alga growing on the rocks) and considerable eel-grass, *Zostera maritima,* which had on it an epiphytic alga. Most striking was the scarcity of *Ulva* and *Fucus,* ordinarily very common everywhere along the beaches of Long Island. *Leathesia* was found epiphytic on *Fucus* in one instance. Two algae reported from more northern situations, Massachusetts to Newfoundland, by William Randolph Taylor in his Marine Algae of the Northeast Coast, were found—*Laminaria platymeris* and *Porphyra miniata* (growing on *Laminaria Agardhii*).

DOLORES J. FAY

NEWS NOTES

Tea given in honor of Mr. and Mrs. Hastings and Dr. and Mrs. Sinnott. On Thursday afternoon, June 13, at 4.30 o'clock 55 members and friends of the Torrey Club were present at a tea given at the Brooklyn Botanic Garden to honor Mr. and Mrs. G. T. Hastings and Dr. and Mrs. E. W. Sinnott. Mr. Hastings has served the Club long and ably as editor of TORREYA; he and Mrs. Hastings were to leave for California on July 1. Professor Sinnott, after many years in Columbia University, goes to Yale University as Chairman of the Department of Botany. An enjoyable part of the entertainment was a visit to the rose garden, then in its glory, to the native-flower garden, and to other places of interest, conducted by members of the staff of the Botanic Garden.

Dr. Adrian John Pieters, botanist and agronomist, died in Washington on April 25, in his seventy-fourth year. He began work in the Department of Agriculture in 1895, and except for a few years in private industry, had served there in various capacities since. He introduced Lespedeza as a forage crop in the South and has been known in recent years as the "Father of Lespedeza." He retired in 1936 at the compulsory age of seventy but was considered so valuable to the department that he was accorded two presidential extensions of appointment.

The Desert Laboratory at Tucson, Ariz., founded thirty-eight years ago by the Carnegie Institution of Washington for the study of arid and semi-arid regions, has been turned over to the Forest Service of the Department of Agriculture. The laboratory's lands and equipment will be used as headquarters of the Southwestern Forest and Range Experiment Station, responsible for all research by the Forest Service in Arizona, New Mexico and the western third of Texas. Dr. Forrest Shreve, director of the Desert Laboratory, will remain to continue some of his investigations.

Boris A. Krukoff, who has been working on his collections of South American Plants at the New York Botanical Garden, has been appointed honorary curator of economic botany. Mr. Krukoff, who was educated at the Imperial University of Kazan, Russia, and later received a B.S. degree at the New York State College of Forestry, Syracuse University (1928), has been engaged in

plant exploration almost continuously since completing his work at Syracuse. During his collecting trips about 11,000 field numbers and more than 100,000 specimens were collected, besides about 4,000 authentic samples of woods.

The thirty-second biennial edition of The Naturalist's Directory will be published in September. This directory gives the names, addresses and subjects of special interest of naturalists in all parts of the Americas. It includes a list of scientific periodicals and natural history museums. It is published by The Naturalist's Directory, Salem, Mass., and the price is $2.50.

Dr. H. A. Gleason made an extensive collecting trip during the summer, covering territory from New York to Virginia and west to the Mississippi and north to the Great Lakes. He brought back to the New York Botanical Garden over 3,000 herbarium specimens. He was accompanied on the trip by John Dwyer, a graduate student from Fordham University.

Dr. A. J. Riker, of the University of Wisconsin, and Dr. P. W. Zimmerman, of the Boyce Thompson Institute, who are members of a committee for the study of problems concerning plant cancers and overgrowths, visited the New York Botanical Garden on August 13 to consult with Dr. B. O. Dodge and members of the laboratory staff of the Garden on the activities of the committee.

In recognition of "distinguished contributions to the science of genetics" Dr. George H. Shull, professor of botany and genetics at Princeton University, received two honorary degrees at June commencements. He received the degree of doctor of science from Lawrence College and the degree of doctor of laws from Antioch College.

Dr. R. Ruggles Gates, professor of botany of the University of London, arrived in the United States the end of July on leave of absence without salary for the duration of the war. After working at the Biological Laboratories at Woods Hole he has gone to Canada, where his address is Middleton, Nova Scotia. He will be available for lectures during this academic year.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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OTHER PUBLICATIONS
OF THE
TORREY BOTANICAL CLUB

(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 66, published in 1939, contained 668 pages of text and 27 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–66 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

Volume 19, no. 1, 92 pages, 1937, price $1.50. Volume 19, no. 2, 178 pages, 1938, price $2.00.

(3) INDEX TO AMERICAN BOTANICAL LITERATURE

Reprinted monthly on cards, and furnished to subscribers at three cents a card.

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BY

GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

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Marine Algae from Long Island

Wm. Randolph Taylor

Following a long-established custom, the writer suggests to his students in courses dealing with algae that when they go off into their various fields of research, every opportunity be taken to secure specimens of algae, particularly marine algae, for study. Most like the idea; few actually arrange to prepare specimens. Those few who do make collections usually get something distinctly worth while, and their success keeps up hope for other occasions. One of the most extensive lots of algae thus brought to the writer's attention was one assembled by Dr. Alfred Perlmutter while in the course of fisheries investigations in Long Island waters. Prepared at considerable inconvenience to himself, this material represents a real contribution to the knowledge of the current Long Island flora, and the writer is very much indebted to Dr. Perlmutter for the opportunity to go over and report upon it here. The chief sets of material will remain in the possession of the collector and the University of Michigan.

Long Island and Long Island Sound seem to support an algal flora intermediate in character between that of more northerly affinities found north of Cape Cod, and the southern flora. The distinction is largely one based on negative evidence: northerly forms are largely lacking, but there are no really tropical types which are known to reach their northern limits in this area. This statement seems to hold true down to the Virginia Capes. One of the interesting features of the recorded flora from our area is the records of sporadic occurrence of distinctly northern forms at scattered stations, presumably representing local cold-water areas. Some of these are of course unrepresented by specimens, and may never be authenticated; others may be based on misidentifications, or errors in labelling. All such forms should be searched for repeatedly to establish their present status in the flora. This paper

adds one authentic record to this small group: *Porphyropsis coccinea,* not previously known from south of New Hampshire. There is no reason, on the basis of the other additions to the Long Island flora, to change our conception of its general character.

Records of Long Island, N. Y., marine algae are not very numerous, nor, for the most part, are the studies particularly thorough or extensive. A very few old local lists, mention in some more general ecological studies, and a few uncritical compilations, make up the bulk of the sources of information. Our earliest records specifically including Long Island algae and those of New York Harbor are those of Durant (1850) and Hooper (1850). Durant's volume, in effect an exsiccata, was prepared in a very small number of copies and not widely circulated; consequently it did little to affect the early study of algae of the area. Hooper rarely gives a more exact record than New York Bay or Long Island Sound, but probably under the latter dealt with some Long Island specimens. Harvey (1852–58), in preparing his *Nereis,* is likewise somewhat vague, and generally by inference refers to mainland stations when mentioning Long Island Sound, but does specifically designate places on the island. Farlow in 1881 mentions certain Long Island stations, and later (1893) a very few others. Pike (1886) is the first to deal in any large way with algae of this area, and his paper gives a long list well furnished with definite locations at which the algae were collected. Jeliffe (1904) offers but two additions. Johnson and York (1912) first gave descriptions of the relation of marine algae to their substrata and to other vegetation on Long Island, a subject also touched by Transeau (1913). Howe, although for many years living near New York and no doubt with occasion to note the algae of Long Island, appears to have published but one paper on them, in which (1914) he gives the occurrence in winter of quite a few species. Burnham and Latham (1914, 1917) give a considerable algal list without, however, many exact localities. Grier (1925) adds several station records, and includes by compilation the earlier ones falling within his territory. Since that time, so far as the writer is informed, there has not been any addition to the published flora of the marine algae of Long Island, although citation of the presence of the various marine species on the island was attempted in the writer's volume on *Marine Algae of the Northeastern Coast.*

The present list adds a few names to the recorded list, and adds considerably to the list of stations at which the various species have been found. Peculiar in its proximity to a great population center, heavily populated on its western end, the island offers special opportunity for observing changes in the algal population with development of the land. The early records of Pike should be systematically confirmed at the nearest practicable points to the original stations. With most of the bays, points and other interesting features of coastal topography easily approached by road, it should be possible to obtain a thorough picture of the flora with relatively little difficulty. Work of a thorough type, rather than scattered records, is needed.

SOURCES OF MATERIAL

The twenty-four stations which were visited for the collections under consideration may be grouped under the following place names. The latitudes and longitudes given are necessarily approximate, but will aid in orientation.

	N. Latitude	W. Longitude
Eastern Long Island Sound, not more exactly identifiable.		
Suffolk County, L. I., N. Y.		
Lake Montauk (on Geol. Surv. maps as Great Pond)	41° 04′ 00″	71° 55′ 30″
Buoy off Lake Montauk	41° 05′ 00″	71° 56′ 30″
Eastern Plain Point on Gardiners Island	41° 06′ 00″	72° 04′ 45″
Gardiners Point Islet outside Gardiners Bay	41° 08′ 30″	72° 07′ 45″
Center of Gardiners Bay	41° 07′ 30″	72° 12′ 30″
Noyack Bay	41° 01′ 00″	72° 21′ 00″
Greenport, opposite Shelter Island	41° 06′ 00″	72° 21′ 30″
Hog Neck Bay	41° 01′ 30″	72° 26′ 00″
North Great Peconic Bay	40° 57′ 00″	72° 30′ 00″
Mattituck on Great Peconic Bay	40° 58′ 45″	72° 31′ 00″
Flanders Bay	40° 55′ 30″	72° 36′ 00″
Tuthill Point on Moriches Bay	40° 47′ 00″	72° 45′ 45″
Bellport on Great South Bay	40° 45′ 15″	72° 56′ 00″
Patchogue on Great South Bay	40° 45′ 00″	73° 01′ 00″
West Sayville on Great South Bay	40° 43′ 15″	73° 05′ 45″
Bayshore on Great South Bay	40° 43′ 00″	73° 14′ 00″
Queens County, L. I., N. Y.		
Far Rockaway	40° 36′ 30″	73° 46′ 30″
Hammels Station on Jamaica Bay	40° 35′ 30″	73° 49′ 00″
Nassau County, L. I., N. Y.		
Glen Cove	40° 52′ 00″	73° 39′ 30″

The Suffolk County stations west to, and including, Flanders Bay all lie within ramifications of the great indentation from Block Island Sound which splits the eastern end of Long Island. The other stations in Suffolk County and those in Queens County lie along the south shore or on bays extending inland from it. Glen Cove in Nassau County is on the north shore to the west.

The stations were mostly littoral, or in shallow water generally two or three meters in depth, occasionally to 15 meters, and the algae were taken by hand or with simple tools or nets. However, at a buoy outside Lake Montauk nearly 23 meters depth was reached during a haul with a shrimp trawl, and a number of algae secured. With the same tackle in eastern Long Island Sound a depth of 30 meters was attained.

LIST OF SPECIES *

Chlorophyceae

Ulvaceae

Enteromorpha plumosa Kützing. (Farlow 1881, p. 44 as *Ulva Hopkirkii*). Hog Neck Bay.

Enteromorpha crinita (Roth) J. Agardh. Bayshore on Great South Bay; Hammels Station on Jamaica Bay.

Enteromorpha erecta (Lyngbye) J. Agardh. Glen Cove. Apparently not previously recorded from Long Island.

Enteromorpha clathrata (Roth) J. Agardh. (Farlow 1881, p. 44 as *Ulva clathrata*). Hog Neck Bay; Flanders Bay.

Enteromorpha intestinalis (L.) Link. (Farlow 1881, p. 43 as *Ulva enteromorpha* v. *intestinalis*). Far Rockaway; Hammels Station on Jamaica Bay; Glen Cove.

Enteromorpha intestinalis forma *maxima* J. Agardh. Hammels Station on Jamaica Bay.

Enteromorpha micrococca forma *subsalsa* Kjellman. Glen Cove, 1 May 1938. Apparently this plant has not previously been reported from Long Island.

Enteromorpha Linza (L.) J. Agardh. (Farlow 1881, p. 43 as *Ulva enteromorpha* var. *lanceolata*). Great Peconic Bay; Flanders Bay; Hammels Station on Jamaica Bay; Glen Cove.

* Descriptions of all species, and illustrations of most of them, will be found in: W. R. Taylor, "Marine Algae of the Northeastern Coast of North America."

Ulva Lactuca L. (Farlow 1881, p. 43 as *Ulva Lactuca* var. *Lactuca*). Buoy off Lake Montauk; Lake Montauk; Flanders Bay; Hammels Station on Jamaica Bay.

Ulva Lactuca var. *latissima* (L.) DeCandolle. Gardiners Point Islet outside Gardiners Bay; center of Gardiners Bay; Noyack Bay; Mattituck on Great Peconic Bay; Tuthill Point on Moriches Bay; Bellport, West Sayville and Bayshore on Great South Bay; Far Rockaway; Hammels Station on Jamaica Bay. The plants from Far Rockaway appeared, as mounted, to be so very thin and so closely attached to the mounting paper that they seemed to be Monostromas. Examination of cross-sections immediately showed that this assumption was incorrect, for they had the usual two layers of Ulva. However, the thickness in the middle of the fronds, which were 1–2 dm. broad, ranged as low as 20μ, though in other specimens 28–43μ, with the cells relatively broad in section as is characteristic of the variety.

Cladophoraceae

Spongomorpha arcta (Dillwyn) Kützing. (Farlow 1881, p. 50 as *Cladophora arcta*). Glen Cove.

Bryopsidaceae

Bryopsis plumosa (Hudson) C. Agardh. Glen Cove.

Phaeophyceae

Ectocarpaceae

Pylaiella litoralis (L.) Kjellman. (Farlow 1881, p. 73 as *Ectocarpus littoralis*). Glen Cove.

Ectocarpus siliculosus (Dillwyn) Lyngbye. (Farlow 1881, p. 71 as *E. confervoides* var. *siliculosus*). Noyack Bay; Greenport opposite Shelter Island; Hog Neck Bay; Hammels Station on Jamaica Bay.

Ectocarpus granulosus (J. E. Smith) C. Agardh. Far Rockaway; Hammels Station on Jamaica Bay.

Chordariaceae

Aegira Zosterae (Lyngbye) Fries. (Farlow 1881, p. 86 as *Castagnea Zosterae*). North Great Peconic Bay.

Elachisteaceae

Elachistea fucicola (Velley) Areschoug. Lake Montauk.

Desmarestiaceae

Acrothrix novae-angliae Taylor (Taylor 1928, p. 577). Noyack Bay, 22 and 27 May 1938 down to 8 meters depth; Hog Neck Bay, 1 June 1938; North Great Peconic Bay, 31 May 1938. Apparently this plant has not previously been reported from Long Island; it was first found in the Buzzards Bay area in 1925. This, then, represents an extension of range. Levring (1937, p. 62) by the finding of forms he considers intermediate in Norway, is inclined to consider that *A. novae-angliae* and *A. gracilis* Kylin are not distinct.

Desmarestia viridis (Müller) Lamouroux. Eastern Long Island Sound; buoy off Lake Montauk; Lake Montauk; Gardiners Point Islet outside Gardiners Bay; center of Gardiners Bay; Noyack Bay; north Great Peconic Bay; Mattituck on Great Peconic Bay; Flanders Bay; Far Rockaway; Glen Cove. From the number of places, and the number of collections near each place, as well as the number of specimens preserved, this appears to have been about the commonest species which attracted the collector's attention.

Desmarestia aculeata (L.) Lamouroux. Eastern Long Island Sound; buoy off Lake Montauk; Mattituck on Great Peconic Bay.

Desmarestia aculeata var. *attenuata* Taylor. (Taylor 1937a, p. 230). Lake Montauk, 23 May 1938; Gardiners Point Islet outside Gardiners Bay. Apparently this variety has not previously been reported from Long Island.

Asperococcaceae

Punctaria latifolia Greville. North Great Peconic Bay; Flanders Bay.

Petalonia Fascia (Müller) Kuntze. (Farlow 1881, p. 62 as *Phyllitis fascia*). Lake Montauk; Glen Cove. The specimens tended to approach the variety in form.

Petalonia Fascia var. *caespitosa* (J. Agardh) Taylor. (Taylor 1937a, p. 230). Far Rockaway.

Scytosiphon Lomentaria (Lyngbye) J. Agardh. Lake Montauk; Flanders Bay; Far Rockaway.

Stilophoraceae

Stilophora rhizoides (Ehrhart) J. Agardh. Noyack Bay; Hog Neck Bay; north Great Peconic Bay.

Dictyosiphonaceae

Dictyosiphon foeniculaceus (Hudson) Greville. Greenport opposite Shelter Island; north Great Peconic Bay; Flanders Bay.

Laminariaceae

Chorda tomentosa Lyngbye. Buoy off Lake Montauk, 17 May 1938; center of Gardiners Bay. Apparently this plant has not previously been reported from Long Island.

Chorda Filum (L.) Lamouroux. Gardiners Point Islet off Gardiners Bay; Noyack Bay; Greenport opposite Shelter Island; Far Rockaway; Hammels Station on Jamaica Bay.

Laminaria Agardhii Kjellman. (Taylor 1937b, p. 190). Buoy off Lake Montauk; Lake Montauk; Eastern Plain Point on Gardiners Island; Gardiners Islet off Gardiners Bay; center of Gardiners Bay; Noyack Bay; Hog Neck Bay; Mattituck on Great Peconic Bay.

Fucaceae

Fucus edentatus De la Pylaie. (Farlow 1881, p. 102 as *F. furcatus*). Buoy off Lake Montauk; Lake Montauk. Apparently this plant has not previously been reported from Long Island.

Fucus spiralis L. (Taylor 1937b, p. 204). Far Rockaway.

Fucus vesiculosus L. Lake Montauk; Hammels Station on Jamaica Bay.

Fucus evanescens C. Agardh. Lake Montauk.

Ascophyllum nodosum (L.) LeJolis. Lake Montauk; Hog Neck Bay; Hammels Station on Jamaica Bay; Glen Cove.

Sargassum Filipendula C. Agardh. (Farlow 1881, p. 103 as *S. vulgare*). Noyack Bay.

RHODOPHYCEAE

Bangiaceae

Porphyropsis coccinea (J. Agardh) Rosenvinge. (Taylor 1937b, p. 219). Eastern Plain Point on Gardiners Island, attached to *Desmarestia aculeata,* growing in 10 meters of water, on the 16th May 1938. This plant has apparently only once been reported from

this country, the earlier record having been from the New Hampshire coast, so that a marked extension of range is indicated.

Porphyra atropurpurea (Olivi) DeToni (Taylor 1937b, p. 220). Glen Cove, 1 May 1938. Apparently this plant has not previously been reported from Long Island.

Porphyra umbilicalis (L.) J. Agardh. (Farlow 1881, p. 111 as *P. laciniata*). Lake Montauk; Glen Cove.

Bonnemaisoniaceae

Asparagopsis hamifera (Hariot) Okamura. (Taylor in Lewis and Taylor 1928, p. 197; 1937b, p. 244). Buoy off Lake Montauk, 17 May 1938. Apparently this plant has not previously been reported from Long Island, but has been known from the Buzzards Bay area since 1927. This represents an extension of range for the species.

Dumontiaceae

Dumontia incrassata (Müller) Lamouroux. (Dunn 1916, p. 271 as *D. filiformis*). Lake Montauk. The writer himself observed this plant in some abundance at Montauk Point, and collected specimens 16 June 1936. This plant has apparently not previously been noted from Long Island, but it was reported from Maine in 1916, and later from James Bay. It is known to occur at various stations between Nova Scotia and Rhode Island.

Corallinaceae

Corallina officinalis L. Lake Montauk.

Solieriaceae

Agardhiella tenera (J. Agardh) Schmitz. (Farlow 1881, p. 159 as *Rhabdonia tenera*). Noyack Bay; Tuthill Point on Moriches Bay; Patchogue, West Sayville and Bayshore on Great South Bay.

Rhodophyllidaceae

Cystoclonium purpureum (Hudson) Batters, var. *cirrhosum* Harvey. Buoy off Lake Montauk; Lake Montauk; Eastern Plain Point on Gardiners Island; Gardiners Point Islet outside Gardiners Bay; center of Gardiners Bay. The writer collected this variety at Montauk Point 16 June 1936. It apparently has not previously been reported from Long Island, though the species is known to occur there.

Gracilariaceae

Gracilaria confervoides (L.) Greville. North Great Peconic Bay.

Gracilaria foliifera (Forsskål) Børgesen. (Farlow 1881, p. 164 as *G. multipartita*).

Gracilaria foliifera var. *angustissima* (Harvey) Taylor. (Farlow 1881, p. 164 as *G. multipartita* var. *angustissima*). West Sayville and Bellport on Great South Bay. The variety apparently has not previously been reported from Long Island.

Phyllophoraceae

Ahnfeltia plicata (Hudson) Fries. Buoy off Lake Montauk; Lake Montauk; Gardiners Point Islet off Gardiners Bay.

Phyllophora membranifolia (Goodenough and Woodward) J. Agardh. Eastern Long Island Sound; Gardiners Point Islet off Gardiners Bay.

Phyllophora Brodaei (Turner) J. Agardh. Lake Montauk; Gardiners Point Islet off Gardiners Bay; Mattituck on Great Peconic Bay.

Gigartinaceae

Chondrus crispus (L.) Stackhouse. Lake Montauk; Gardiners Point Islet off Gardiners Bay; Bayshore on Great South Bay; Glen Cove.

Rhodymeniaceae

Rhodymenia palmata (L.) Greville. Buoy off Lake Montauk; Lake Montauk; Gardiners Point Islet off Gardiners Bay; center of Gardiners Bay; Mattituck on Great Peconic Bay.

Ceramiaceae

Antithamnion americanum (Harvey) Farlow. (Farlow 1881, p. 123 as *Callithamnion americanum*). Buoy off Lake Montauk; Eastern Plain Point on Gardiners Island; center of Gardiners Bay.

Antithamnion cruciatum (C. Agardh) Nägeli. (Farlow 1881, p. 122 as *Callithamnion cruciatum*). Lake Montauk.

Seirospora Griffithsiana Harvey. (Farlow 1881, p. 129 as *Callithamnion seirospermum*). Noyack Bay.

Griffithsia globulifera Harvey. (Farlow 1881, p. 131 as *G. Bornetiana*). Noyack Bay.

Ceramium rubrum (Hudson) C. Agardh. Lake Montauk; Gardiners Point Islet off Gardiners Bay; Hammels Station on Jamaica Bay.

Spyridia filamentosa (Wulfen) Harvey. Hog Neck Bay.

Delesseriaceae

Phycodrys rubens (Hudson) Batters. (Farlow 1881, p. 162 as *Delesseria sinuosa*). Lake Montauk; Eastern Plain Point on Gardiners Island; Gardiners Point Islet off Gardiners Bay; Mattituck on Great Peconic Bay.

Grinnellia americana Harvey. Noyack Bay; Bayshore on Great South Bay.

Dasyaceae

Dasya pedicellata (C. Agardh) C. Agardh. (Farlow 1881, p. 177 as *D. elegans*). Hog Neck Bay; Noyack Bay; north Great Peconic Bay.

Rhodomelaceae

Polysiphonia flexicaulis Harvey. (Farlow 1881, p. 173 as *P. violacea* var. *flexicaulis*). Gardiners Point Islet off Gardiners Bay.

Polysiphonia urceolata (Lightfoot) Greville. Eastern Plain Point on Gardiners Island; Gardiners Point Islet off Gardiners Bay; center of Gardiners Bay; Mattituck on Great Peconic Bay; Far Rockaway; Glen Cove.

Polysiphonia nigra (Hudson) Batters. (Farlow 1881, p. 174 as *P. atrorubescens*). Gardiners Point Islet off Gardiners Bay.

Polysiphonia nigrescens (Hudson) Greville. Buoy off Lake Montauk; Noyack Bay; north Great Peconic Bay; Mattituck on Great Peconic Bay; Flanders Bay.

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Supplementary Notes on Acorus and Arabis

Roland M. Harper

In Torreya for December, 1936, I discussed the question of whether *Acorus Calamus* was native in the United States or not, and expressed considerable skepticism, on account of the species being obviously planted or escaped in many places, and being known also in Europe and Asia. That article brought me more letters than anything else I ever wrote for a botanical magazine, most of them giving information about additional localities for the species in question, which I hope to incorporate in some future publication. One of my correspondents also called my attention to the embarrassing fact that Murray F. Buell had published a short paper on the same subject in *Rhodora* for October, 1935, which I had been wholly unaware of, on account of not getting that magazine for several years past. Mr. Buell concluded that *Acorus* is native in North America, at least near the middle of the continent, "though the records . . . . have become much blurred by human interference."

Charles C. Deam, in his splendid Flora of Indiana, 1940 (map on page 271, text on page 277, particularly under *Spathyema*), says that *Acorus* is widely distributed in that state, flowering and fruiting throughout, but prefers sunny places, never associating with *Spathyema*. This would seem to indicate that it was not common in prehistoric times, when most of the state was presumably covered with forest.

On a visit to New York in June, 1940, for the first time since 1932, I saw for the first time Milton Hopkins's monographic study of *Arabis* in eastern and central North America, in *Rhodora* for March, April and May, 1937. It seems to be as good a piece of work as could be done with existing herbarium specimens; but some additional references to literature on my *A. Georgiana* would have made the story more complete, and rendered superfluous his comment on the poor condition of one of my specimens, collected in midwinter.

Mr. Hopkins dug up some old specimens of *A. Georgiana* that I had not seen, collected long before my time, in Georgia and Alabama, by Chapman, Boykin and Mohr, none of whom recognized it as undescribed. (Dr. Mohr's specimen from Pratt's Ferry,

Alabama, is probably what he referred to *A. patens* in his Plant Life of Alabama, 1901.) Hopkins's distribution map for that species shows three stations in Georgia and two in Alabama, but omits the type-locality, on the state line.

As stated in the original description (TORREYA, **3**: 87–88. June, 1903), I first found the plant on the bank of the Chattahoochee River in Stewart County, Georgia, July 18, 1901, in fruit. The seeds, or some of them, were ripe enough to germinate, and some planted at the New York Botanical Garden produced plants which bloomed in April, 1903, enabling me to describe the species.

On December 30, 1903, I found what was evidently the same species on the Oostanaula River in Gordon County, northwestern Georgia. It was of course all dead at the time, but I took a few specimens (one of which was cited by Mr. Hopkins), and reported the occurrence in TORREYA, **4**: 24–25. February, 1904.

The next development was finding it on the Coosa River in Elmore County, Alabama, December 9, 1905. I revisited the spot on April 24, 1906, and found it in bloom, and reported it in the Bulletin of the Torrey Botanical Club a few months later (**33**: 532. 1906). I have not met with the plant in the succeeding 34 years, which suggests that it must be rather rare. But with about six stations on record, in two states, it could probably be found in similar habitats elsewhere if one looked for it. It would be most conspicuous at flowering time, but its best distinguishing characters are in the fruit.

UNIVERSITY, ALABAMA.

Guide to the Lichens of the New York Area—Part 8

G. G. Nearing

Group 8—*continued*

Physcia stellaris. Star Lichen

Fairly common on trees and rocks throughout the New York area. The small, but rather conspicuous and dainty rosettes, up to 5 cm. across, lie rather flat, with regularly radiating branches about 1 mm. wide, which are distinctly convex. The central parts become a confused, warty mass. The color of the dull upper surface is whitish or silvery gray to slate, darkening in the center. The under surface is white or pale gray, with small, whitish root-like holdfasts.

Fruits usually many, often very plentiful, as much as 4 mm. in diameter, but most of them commonly less than 2 mm. The flat disk is dark brown or black, often frosted pale gray, the rim pale gray, smooth, toothed or broken. Spores 2-celled, brown, 14 to 24 by 7 to 11 microns.

Physcia stellaris, a well marked though variable lichen can be distinguished by its pale gray color, and the absence of soredia in any form. Smaller than most of the gray Shield Lichens (Groups 5 and 6), it is further distinguished by its dull surface. The puffed Parmelias, especially *P. colpodes,* may resemble it superficially, but all are black or dark brown beneath. *P. centrifuga* and *P. ambigua* both have a distinct yellow tint wholly lacking in *Physcia stellaris.* Most other species of Physcia have soredia. Of those which have not, *P. adglutinata* is small, dull, inconspicuous, with very thin tips. *P. tribacia* has many white points on the tips and margins and may have soredia. The only likely confusion is with *P. aipolia,* a mere subspecies, separated by its broader lobes, with an under surface and holdfasts which blacken. Doubtful specimens should be called *P. stellaris.*

Physcia aipolia

Also called *P. stellaris* var. *aipolia,* or included in *P. stellaris.* A subspecies differing but little. The tips tend to widen and raise their thinnish margins slightly, in contrast to the turned-down margins and thick tips of *P. stellaris.* The under surface and holdfasts of *P. aipolia* tend to blacken. Though the name is in use in the

New York area, it is doubtful whether this form deserves to be considered a subspecies or even a variety.

Physcia granulifera. Granular Blister Lichen

Also called *Anaptychia granulifera.* A poorly defined species, to be looked for in the New York area on tree-bark. Probably rare. It resembles somewhat *P. pulverulenta,* but instead of brown is pale gray or white, with whitish, mealy granules near the tips, also with white masses of soredia and tiny prongs scattered over the upper surface. The under surface is pale, with black root-like holdfasts. Fruits are usually frosted white, with spores variously described.

From pale forms of *P. pulverulenta* it can be distinguished by examining a microscopic section, in which the upper surface consists of parallel fungus threads (the characteristic structure of the genus Anaptychia) instead of the cellular structure of Physcia proper. This can perhaps be seen clearly by an expert microscopist, but there is doubt whether the character follows natural relationships, or whether it has resulted in some specimens being placed with species to which they are not actually related. It is probably in reality a minor variant. *P. granulifera* is mentioned doubtfully here, as unlikely to occur, though it has been found in Pennsylvania.

Physcia caesia. Blue-Gray Blister Lichen

Though named a hundred years ago, this species is not well understood. It occurs on cliffs containing lime, also sometimes on trees, resembling *P. stellaris,* though, in place of the central crust, there is a mass of intertangled branches. The upper surface is pale gray, the under surface also pale, sometimes darkening, while the holdfasts are usually dark. The determining character is the presence of compact, nearly hemispherical mounds of pale blue-gray, or occasionally whitish, soredia as much as 5 mm. in diameter, studded along the main branches, where fruits would be expected. Care must be taken not to confuse these with the dots of white pith exposed where snails have eaten the fruits of *P. stellaris.* Soredia are masses of powder which come off as whitish dust on the fingers when handled, while the pith has the substance of white cardboard. Fruits and spores, when present, are like *P. stellaris.*

As *P. stellaris* has no soredia, any lichen resembling it, but having soredia, should be compared with *P. caesia,* also with *P. astroidea* and *P. sorediata.* The substance of *P. caesia* is thinner than *P. sorediata,* the pale gray color considerably brighter. The sorediate masses rest on the center of the branch rather than on its margin, and, most important, the pith, when the surface is scratched away, is white, not yellow. The smaller *P. astroidea* has soredia loosely scattered rather than compact.

Physcia astroidea. Smaller Star Lichen

Found occasionally on trees or rocks, forming much-branched rosettes about 2 or 3 cm. across, with parts less than 1 mm. wide and almost uniformly flat, lying close to the foothold. The color is pale gray or whitish. Toward the center appear loosely clustered granules and soredia. The under surface is white, with many pale, root-like holdfasts, but in var. *hypomela* this surface and its holdfasts blacken.

Fruits up to 1.5 mm. in diameter, black or frosted whitish, with a wavy, narrow, gray rim. Spores 2-celled, brown, 17 to 25 by 7 to 11 microns.

P. astroidea is a difficult subspecies intermediate between the two variable species *P. stellaris* and *P. tribacia,* and is seldom clearly determined, especially because the young rosettes of the two other species abound on the bark where it grows. The presence of soredia, together with its small size and thin texture, separate it from *P. stellaris,* but only the blunt tips, which lie rather flat, separate it from *P. tribacia,* whose tips rise, and divide into lacey points, dusted white. In contrast to *P. caesia,* which besides is almost confined to rocks, the *white* soredia of *P. astroidea* are not massed densely in large clusters, but usually loose aggregations of granules scattered over the vague central crust. It may somewhat resemble the larger *Cetraria aleurites* (Group 5), which however has the tips shiny instead of dull, while the central prongs and granules are without soredia, therefore not dusty.

Physcia tribacia. Lace-Tipped Lichen

A tiny species covering large areas everywhere on trees and rocks equally. So small are the parts in some specimens that they

would hardly be thought Papery Lichens until examined closely. Completely developed and fruiting rosettes may often be only 1 cm. or less across, but often the individual rosettes merge in almost uninterrupted masses a meter or more across and 2 or 3 mm. thick. The narrower parts, especially when growing on rocks, may be only 0.1 mm. wide, while on trees the lobes may broaden to 1 mm. or more, but are then commonly shorter than 1 cm. The tips and margins tend to curl away from the foothold, dividing into fine, lacy points dusted white. The upper surface is pale gray, often covered centrally with a minute lacy growth which makes the entire lichen appear white. There are no massed soredia, but only fine dust. The under surface is pure white, and there are spreading, white holdfasts often much in evidence.

Fruits are frequent, up to 2 mm. in diameter, either blackish brown or frosted white, with a pale gray, often crinkled rim. Spores 2-celled, blackish, 16 to 23 by 7 to 10 microns.

Physcia tribacia, though variable, is one of our easy lichens to learn because common everywhere, especially on roadside oaks. Most other Papery Lichens small enough and pale enough to resemble it, do not lift their tips. *P. teretiuscula* has even narrower parts, which cling close to the rock, and smaller spores. *P. astroidea* tends somewhat larger, without the white points on tips and margins, and with mostly blackening holdfasts. *P. tribacia* must not be confused with *Cladonia caespiticia* (Group 13), also plentiful at the bases of trees, a dense mat of flakes, each usually no more than 2 or 3 mm. long, but more than that in breadth, and instead of spreading by trunks and branches, each flake springing individually from the foothold. *Crocynia zonata* (Group 14) should be mentioned also, tiny and flat, marked with concentric zones of whitish tips on dark gray, rosette-like, flaked crusts.

Physcia teretiuscula. Small Blister Lichen

Found occasionally on slate and shale, in rosettes usually less than 1 cm. across, the parts closely pressed against the rock, branches dividing to 0.1 mm. and smaller, with slender, pointed tips touching the rock. The central parts pass into a confused tracery with tiny granules and soredia, but all flat and thin, with margins curling down to make the parts convex above, slightly

grooved beneath. Upper surface whitish to pale gray; under surface pale.

Fruits rather frequent, up to 0.5 mm. in diameter, blackish, with a pale rim, which may be smooth or bear granules and soredia. Spores 2-celled, blackish, 11 to 17 by 5 to 9 microns, usually near the minimum.

Physcia teretiuscula, as seen in the New York area, is the smallest of the genus, one of the smallest of Papery Lichens, requiring close examination with a lens to see its parts. Most nearly allied to *P. tribacia,* it differs in lying perfectly flat, with margins curled down, and in the spores, which are commonly smaller than any other local species of Physcia. Especially distinctive are the granules and soredia on the fruit-rims, for no similar lichen has them. This species is smaller than *P. Frostii,* with narrower and more pointed parts, and is much more often found bearing its very different fruits. *Crocynia zonata* (Group 14) is often as small, but much darker, and marked with zones of its pale tips. The rarity of *P. teretiuscula* helps to distinguish it from *P. tribacia* and *Crocynia zonata,* both common. The form differs somewhat from that originally named in Europe, but this name seems to be the best one for it.

Physcia hispida. Hood Lichen

Also called *P. tenella* or in part *P. ascendens.* Found occasionally on trees and rocks in limestone country, in the form of rosettes about 1 cm. across, which may be so closely crowded that the rosettes are lost in a continuous intertangled mass of indefinite area. Each branch divides into not more than 3 or 4 parts, no more than 1 mm. wide, which may rise 2 or 3 mm. from the foothold. The upper surface is ashy gray, tipped whitish, and with frequent white or blackish hairs, not only along the margins, but sometimes also on the upper surface. These are not different from the root-like holdfasts on the white under surface. The tips slant upward with toothed edges, or are puffed and blistered into lumpy swellings, which burst outward, frequently leaving a thin, hood-like structure. The form known as *P. ascendens* differs only in having the tips dusted lightly with soredia.

PLATE 12

Fig. 1. *Physcia stellaris,* pale gray.
Fig. 2. *P. stellaris,* fruits.
Fig. 3. *P. stellaris,* spores.
Fig. 4. *P. aipolia,* pale gray.
Fig. 5. *P. caesia,* tips.
Fig. 6. *P. caesia,* pale blue-gray.
Fig. 7. *P. astroidea,* tips.
Fig. 8. *P. tribacia,* gray to whitish.
Fig. 9. *P. tribacia,* various tips.
Fig. 10. *P. hispida,* pale gray.
Fig. 11. *P. hispida,* tips and fruit.
Fig. 12. *P. endochrysea,* tips and fruit.
Fig. 13. *P. endochrysea,* dull drab.
Fig. 14. *P. endochrysea,* spores in various stages.
Fig. 15. *P. teretiuscula,* pale gray.
Fig. 16. *P. teretiuscula,* tips and fruits.

Fruits black, brown or frosted white, up to 2 mm. in diameter, with a smooth or broken, whitish rim. Spores 2-celled, brown, 12 to 22 by 6 to 10 microns.

Physcia hispida can be definitely determined by one glance at the illustration. The puffed and blistered tips, bursting open, have a distinctive character easily recognized. The somewhat similar *P. comosa* (Group 4), with longer hairs, does not burst its tips, but bears bell-shaped fruits there, while the fruits of *P. hispida* occur along the branches, far from the tips. The puffed Parmelias (Group 5) have no hairs above, and are dark beneath, *P. physodes* alone bursting its tips, but in a different manner. No other lichens resemble *Physcia hispida,* unless *P. tenella* and *P. ascendens* are considered separate species.

Physcia obscura. Dark Blister Lichen

Found throughout the New York area on trees and rocks, especially in shaded places. Frequent. Much more common, and differing only in internal color, is *P. endochrysea,* really only a variety of *P. obscura,* but well enough known locally as a species, to justify retaining that rank here. *P. obscura* is white within, *P. endochrysea* bright blood-orange, as shown where scratched or broken, or where eaten by insects, which are particularly fond of herbarium specimens. For description and comparisons, see *P. endochrysea.*

Physcia endochrysea. Orange-Pith Lichen

Also called *P. obscura* var. *endochrysea.* Growing on tree-bark everywhere, also on rocks and over moss in shaded places. One of our most common lichens, but escaping attention because of its dull color. Rosettes usually 3 or 4 cm. across, or running together to cover an indefinite area. The branches and lobes, 1 mm., or at most 2 mm. wide, remain close to the foothold, the central parts often running together in a confused mass, with heaps of pale green or gray soredia, irregularly 1 mm. or so across, or massed into a sorediate crust 2 to 3 mm. thick. There are sometimes also incrustations of blackish granules. The upper surface is dull drab when dry, dusky green when wet, the under surface black, with many black holdfasts, densely spreading, and commonly showing from above as a fringe. The pith is blood-orange.

Fruits brown or black, up to 4 mm. in diameter, with a thick, smooth, drab rim, on the under side of which are often radiating bristles, forming a fringe visible through a very strong lens. Spores 2-celled, brown, 14 to 32 by 7 to 12 microns.

Physcia endochrysea, because so nearly the color of bark or stones, is not often seen unless searched for. When found, a slight scraping with the knife or fingernail reveals the brilliant color of its pith. Since this species is common, scratch any small, dusky rosettes until the orange pith is seen. If exactly similar rosettes but with white pith are later found, these are the less common *P. obscura.* A larger, pale form, also with white pith, but in most other respects similar, is *P. setosa,* another subspecies. A lichen in which the pith is dull yellow, is *P. sorediata,* drab with whitish soredia. The only local Papery Lichen with a pith color to compare with *P. endochrysea,* is the subspecies *P. endococcinea,* a color form of *P. setosa,* having bright orange or orange-buff pith, but usually with this shade showing also under some of the tips, and even on some holdfasts.

Physcia setosa. Bristly Lichen

Found in the northern part of the New York area, and said to be common in parts of New England. As it is only a subspecies of *P. obscura,* with no definite points of distinction, it may be interpreted freely or ignored. It grows somewhat larger, in rosettes up to 10 cm. across, with larger and more luxuriant parts, sometimes decorated with tiny lobes along the branches, when it approaches *P. hypoleuca,* which it resembles in the whitish or ashy color of the upper surface, but contrasts with in being black beneath. The pith is white. A distinguishing feature is the fringe of bristles under the fruit-rim, like that in *P. obscura,* but better developed. Spores tend broader than in *P. obscura,* up to 30 by 17 microns. It is interesting that *P. setosa* may grow intermingled with *Candelaria fibrosa* (Group 9), making a sharp contrast with the lemon-yellow hue of that species, but in structure and size, including the fringe of bristles, the two appear identical, differing only in color and in the spores.

Physcia endococcinea. Orange-Tip Lichen

A subspecies found occasionally on wet rocks, mostly limestone. The name is sometimes considered to be interchangeable with *P. endochysea,* and the lichen does not greatly differ in essentials, bearing the same relation to *P. setosa* that *P. endochrysea* bears to *P. obscura.* The pith is of nearly the same orange color, which may vary considerably in both lichens, but is always bright. The upper surface is paler, often nearly white. Fruits are usually plentiful. The habit is so much more luxuriant than *P. endochrysea* that it closely resembles *P. hypoleuca,* and further, some of the tips are bare of the normal lower layer of cells, exposing the brilliant pith, at which points the holdfasts also may be orange. Thus *P. endochrysea* is black beneath, *P. endococcinea* black with occasional orange tips, *P. hypoleuca* white. The key to the true relationship of *P. endococcinea* is seen where a few bristles occur under the fruit-rims.

(*Group 9 will contain Candelaria, Teloschistes in part, Caloplaca in part.*)

Six lichen groups out of a projected 30 groups, have now been published over a period of two years in Torreya, and the interest in the series expressed by readers has been very gratifying to the author. The writer is considering the completion of the work and bringing it out in book form, amplified to include most of the lichens of the northeastern states. If interested readers who have not already expressed themselves, will write to G. G. Nearing, P. O. Box 338, Ridgewood, N. J., they will be informed when future groups are to be published.

Forty Years of Torreya

This number completes the fortieth year of publication of Torreya. At the annual meeting of January 8, 1901, Dr. Britton offered the following resolutions, which apparently were unanimously adopted:

"*Resolved:* That the publication by the Club of a monthly periodical is desirable, to contain short articles and notes with special reference to the study of the local flora, thus covering ground occupied by the Bulletin at its establishment in 1870.

"*Resolved:* That the editors be authorized and requested to proceed at once with the publication of such a periodical and to designate an editor for it from their number.

"*Resolved:* That the periodical bear the name 'TORREYA' in honor of Dr. John Torrey, the founder of the Club."

At the meeting of the Club on January 30, Dr. Marshall Avery Howe was appointed editor "of the Club's new journal TORREYA." But the editorial board, of which Dr. Howe was a member, had already brought out the first number. During this first year short articles or notes were published by thirty-three different members, several contributing five or six times each. Among these contributors five are still members of the Club—Professor Henry C. Beardslee, Dr. Edward W. Berry, Mr. Stewart H. Burnham, Dr. D. T. MacDougal and Dr. Roland M. Harper. The last named had an article in the Bulletin in 1900 and has had one or more articles in every volume of TORREYA. During the first year Proceedings of the Club continued to be published in the Bulletin, but the next year were published in TORREYA, as they have been ever since. Very brief reports of Field Days were published in the early numbers. In the October, 1901, number it is stated that "During the summer months weekly excursions have been made by members of the Torrey Botanical Club to interesting localities."

TORREYA was published monthly from 1901 through 1919, the number of pages exceeding even in the first year the twelve per issue authorized by the Club. In the News Notes of the number for December, 1919, we read, "Beginning with Volume 20, TORREYA will be issued bi-monthly. This has been decided because of the greatly increased cost of production. As heretofore its pages will be open to all who have something to say of interest to botany, but if more material is offered for publication than we have room for, preference will be given to members of the Club, and to notes on local botany."

Dr. Howe was editor for seven years (the last year assisted by Dr. Philip Dowell) when he became editor of the Bulletin. Miss Jean (now Doctor) Broadhurst was editor for 1908, 1909 and 1910. For the next ten years Mr. Norman Taylor was editor. The present editor began his work for the Club in 1921 and has now completed twenty years of service. Next year Dr. William J. Bonisteel

of Fordham University takes over the editorship. We wish for him the same loyal support the previous editor has enjoyed.

BOOK REVIEWS

Plant Physiology *

Ralph C. Benedict

The Meyer and Anderson text, Plant Physiology, is an interesting and valuable addition to the list of recent new texts and new editions in its field. Designed as a text for college use, its authors postulate as necessary prerequisites a year each of general botany and general chemistry. As with other recent plant physiologies, its development proceeds almost entirely from the physical sciences. For example, its first five chapters deal successively with such topics as "solutions," "interfacial phenomena," "colloidal systems," "sols and gels." After a sixth chapter on "The plant cell," four more chapters follow on "diffusion," "osmosis," "imbibition," and "permeability." The remaining 27 chapters have botanical titles, but all include considerable appropriate discussion of relevant physico-chemical principles and facts.

That a text developed along these lines to a higher degree than others will be welcome and valuable there seems no basis for doubt. Whether it will find favor for class use will perhaps depend upon the training and predilections of specific course heads and the preparation of available students. In any event, its value for reference use seems indubitable.

In keeping with the emphasis on the physico-chemical aspects of plant physiology, the authors have introduced less than the usual amount of structural data and illustration. The reviewer's personal preference would be for a somewhat greater emphasis on the anatomical bases of plant functions. Along the same line is a preference for less formalized representations than that of a segment of young corn stem (fig. 53). Of three bundles shown, none shows clearly the predominant pattern of three vessels char-

* Meyer, B. S., and Anderson, D. B. Plant physiology. Pp. 696. Van Nostrand Co. 1939.

acteristic of most such bundles, and there is no indication of the well-marked, clearcut pattern of sieve cells and companion cells found in every Zea cauline bundle.

In line with the expressed purpose outlined in the preface, the text presents in more positive form than some other texts the author's preferences among various more or less debatable concepts. For example, in explaining the rise of liquids in stems, after preliminary discussions during which certain vital factors and root pressure are admitted as possible minor factors, the authors set up "the cohesion of water theory" as an almost completely satisfactory explanation and state that "At the present time most plant physiologists are agreed that the cohesion of water theory is a correct representation of the principle mechanism by which water is transported through plants, be they the tallest of trees or herbs only a few feet in height." To a reviewer who is not a plant physiologist, it is difficult to see how the tensile strength of any elongate column, water or wire, can be counted as anything but secondary to the force or forces which exert the necessary pull at the top of the column. Imbibition seems not even to be accorded mention among possible factors.

While the selection of specific theories for substantial support and preference is justifiable and desirable, it is likely to raise question of dispute on the part of other botanists, who may have their own pet theories or who may feel that for some given phenomenon, no positive stand is justified. For the reviewer, such a case is illustrated by the following statement: "No reputable botanist has held for generations, for example, that plants obtain their food from the soil, yet this and other fallacious beliefs are still widely entertained among the general population." The question at issue is, of course, primarily one of semantics and pedagogy, but the reviewer, whatever his category, admits to a pet aversion against this particular limitation of the meaning of the word, food. Moreover, he would even hold that botanically and chemically the definition of the word, food, must be expanded to include water and minerals, not to mention thiamin, root-absorbed glucose, etc.

Another point in which semantics is perhaps more involved than fact is found in the discussion of guttation. "The drops of guttation water which form at the tips of grass blades and the tips and edges of the leaves of other plants are often erroneously con-

sidered to be dew" (p. 170). It would seem that the word, dew, might better be left in its general connotation to cover all examples of wet lawns, etc., occurring without visible precipitation. The review would extend his cervical region to the extent of expressing the opinion that most cases of wet feet incurred on summer mornings are the result of "botanical dew," not of "physical dew." It is realized that this opinion does not seem to be widely held, but that, it is suggested, is merely because botanists have accepted the physicists' word for it.

In these references to minutiae, there is no wish to withhold from the Meyer and Anderson a due meed of praise as a scholarly, comprehensive, and valuable text which seems certain of wide use and approval.

Rocky Mountain Trees *

Arthur Harmount Graves

Reliable floras of any given region are always welcomed by the herbarium student, the trained taxonomist, or by the traveller who is botanically minded. In my own travels in this country and in Europe, I have often wished for books of this sort to which I could turn in time of need.

Although authoritative floras of the Rocky Mountain region are available, up to the time of the publication of "Rocky Mountain Trees" there has been none devoted exclusively to the trees of the region; in particular none which treats of them with regard to their silvical and ecological, as well as their purely botanical, or, rather, their morphological characters.

As the author states, "public interest in trees and forests has increased greatly in recent years." It appears that this interest is being steadily maintained, with a regularly mounting curve, and that, therefore, with the passing years, there will be an even greater demand for books of this kind.

* Rocky Mountain Trees, A Handbook of the Native Species, with Plates and Distribution Maps. Richard J. Preston, Jr. Iowa State College Press. 1940. $2.00.

Professor Preston, who is Associate Professor of Forestry in the Colorado State College, has made use of the best possible resources in the preparation of his book. For example, the plates for the conifers, with four exceptions, were made from drawings used in Sudworth's bulletins on the trees of the Rocky Mountains. The distributional maps accompanying the descriptions of each species were referred to government, experiment station and college experts. "The description of genera and species are based largely on material secured from the sources listed under the selected bibliography." A point which appeals strongly to the writer is that the descriptions include not only the botanical characters of the species, but also silvical characters, such as habitats, tolerance, in many cases the character of the root system, enemies, reproduction and associates.

The following states and parts of states are included in the author's delimitations of the Rocky Mountain region; Montana, Idaho, Wyoming, Colorado, Utah, Nevada, Arizona, New Mexico, extreme western Texas, and the Black Hills of South Dakota. Further there is a list of trees found in each state. A key to the genera follows, and throughout the book, keys to the various species within certain genera.

In addition, there is a description of the six life zones or belts occurring in the Rocky Mountain region, as well as several pages devoted to the explanation of "tree characters." A glossary of botanical terms and a bibliography and index conclude the book.

Further, to conform to the title of the book, not only are the trees of the above mentioned states included, but also those of the adjacent Rocky Mountain region of Canada, even extending into Alaska—truly a vast area. Such species (which do not occur in the U. S. Rockies at all, but extend from the eastern U. S. into the Canadian Rockies) are, for example, the Balsam Fir, the White and the Black Spruces, the Jack Pine, Eastern Larch, etc. Thus 252 species representing 85 genera and 40 families have been treated, as well as numerous varieties.

This review is being written in a far off, little-known spot on the Maine coast, where no reference books are available, but we believe that we are not making a rash statement in saying that this number of tree species (252) is several times greater than the number of those in all Northern Europe.

Enough has been said to show that the book is a great asset not only to the forester and tree lover in general, but also to all tree-minded persons who are travelling in the Rockies.

The Flower Family Album *

George T. Hastings

A great help to the beginner in plant study is to know the characteristics of a few of the larger families of plants. This knowledge will serve as an introduction to a surprisingly large number of the plants he meets; the individual plant may be a stranger but he will know its family relationships. There has been little to help in learning these characteristics. Here is a book intended to show the families to which four or five hundred wild and cultivated plants belong. Conversely, the book gives the characteristics of fifty of the larger and commoner plant families, making it possible to place at least three-fourths of the wild flowers and a larger proportion of cultivated ones.

On each page of the book are drawings of from six to ten members of a particular family, showing clearly the appearance of the plants and their comparative sizes. A few pages cover two or three small families; for some of the larger families there are several pages—four each for the Lily and Buttercup, two each for the Iris, Pink, Pea, Mint and Nightshade and ten for the Composite. The drawings, or "portraits" by Gretchen Fischer Harshbarger are clear and accurate. On the pages opposite the drawings are the descriptions of the families and of the plants shown. The descriptions are non-technical but complete enough for the purpose of the book.

Printed by the offset process on long pages, with stiff paper covers, the book is attractive in appearance and will be a delight to the gardener, flower lover and amateur botanist.

* The Flower Family Album, Helen Field Fischer. Box 5, Shenandoah, Iowa. 1940. $1.50.

FIELD TRIPS OF THE CLUB

Trip of June 1 to Staten Island

The field trip to Staten Island "for Sedges and Grasses to an interesting sphagnum bog" had to be shifted at the last moment to another region because the heavy rains a few days earlier had flooded the bog with several inches of water.

From the ferry the group went by bus to Fours Corners, then by the Travis bus to Sigers Road. The way led along the road to the marshes, across them to the bridge over the creek on Travis Avenue, then east to the water works near the Bird Sanctuary.

Only the more common sedges were found, except for *Carex rosea* Schkuhr., a sedge that was collected on May 25, 1889, by Dr. N. L. Britton on Staten Island. The criteria are—(1) slender, brownish, *not* twisted, stigmas; (2) beak little contracted; (3) inconspicuous whitish edge to orifice of perigynium. The only uncommon grass found was *Puccinellia distans* (L) Parl., collected at the edge of the marsh in early fruiting condition.

In the latter part of the afternoon our original group of four was joined by the Staten Island Bird Club of sixteen people and we then spent some time exploring the Springville Bird Sanctuary established by William T. Davis a number of years ago.

At the entrance to the sanctuary the ground was nearly bare of vegetation except for a large number of green balls half an inch in diameter lying scattered on the surface. These were fastened to the soil by a brown, withered strand that must have been earlier the growing support of the balls. A little study of these objects showed them to be the seed pods of the Fawn Lily (*Erythronium americanum* Ker.).

William H. Wiegmenn and A. T. Beals

Trip of June 8 to Oxford, Conn.

This was advertised as a joint meeting with the Connecticut Botanical Society but the only Torrey Club member present was the leader. About twenty members of the local society attended.

Whorled Pogonia was seen in dry woods at Oxford in the last stages of its flowering and on the borders of a wooded swamp were the Mountain Holly, *Nemopanthus mucronata,* and *Woodwardia*

areolata. A quantity of Moccasin Flower, *Cypripedium acaule* was much admired.

After eating lunch on Mr. Harger's lawn the party was shown Black Swallow Wort, *Cynanchum nigrum* by the roadside and Painted Cup, *Castilleja coccinea* in a field nearby. Later a rich rocky hillside was explored, the most notable species seen here being the grass *Melica striata,* this being the most southerly of the six reported stations in the state. *Carex longirostris* was growing here, but most of the more interesting plants of these woods were either past bloom or not yet in flower. These included Red Berried Elder, *Sambucus racemosa;* Alleghany Vine, *Adlumia;* Red and White Baneberries, *Actaea;* Blue Cohosh, *Caulophyllum;* Pale Jewel Weed, *Impatiens pallida;* Wall Wort, *Parietaria;* and Dogwood, *Cornus circinata.*

E. B. Harger

Trip of July 20, 1940, to the Fern Garden of Mr. W. H. Dole, West Orange, N. J.

Fourteen members and guests of the Club visited the fern garden on this trip. Seventy-six species and varieties of ferns were seen, in most cases well established, and, as a result of the cool spring and frequent rains, in the best of condition.

All of the ferns seen last year came through the winter, though some of the western and oriental species were slow to start new growth. The specimen of *Atherium alpestre* var. *americanum* from Mt. Rainier, set out in 1935 as a small plant has shown rapid increase by subdivision and now two clumps, one in shade most of the day and the other in the rock garden (limestone) in a sunny location, appear happy in their new surroundings.

Success in growing ferns appears to be largely a matter of light and shade or of position and drainage. Most ferns except those of the deep woods object to low shade and with a few notable exceptions appear rather indifferent as to soil—the upland lady fern, listed as preferring acid soil, thrives anywhere and everywhere in the garden and sporelings appear regardless of soil conditions, in the rock garden (limestone) or at the edges of the tiny "bog garden" where the soil is acid.

A specimen of *Woodsia ilvensis* found in 1936 growing in a vertical crevice in a moist location near the bottom of Haines Falls,

Green Co., N. Y., and planted in a similar position in the rock garden (limestone) has done well and is now a finer specimen than when found, though the species usually seems to favor well-drained positions on top of non-calcareous soil.

New ferns being tried out are some of the species seen at the fern exhibit of the New York Botanical Garden at the New York Flower Show last March and said to be hardy here. These were set out in the garden about the end of April and include the following western species: *Polystichum Andersoni, P. lonchites, P. aculeatum plumosum compactum* (and its crested form) also a West Indian species, *P. viviparum.* All of these have developed new fronds and appear to be thriving.

After having inspected the garden, all were invited by Mrs. Dole to rest awhile in the shade of the porch and to partake of cooling drinks.

W. H. Dole

Trip of August 3-4 to Lake Shehawken, Pa.

A very enthusiastic group of eleven escaped from metropolitan life to make botanical adventures into the unvisited lake country of Wayne County, Pennsylvania. An elevation of over two thousand feet, night temperature of 50, day temperature of 70, sunny skies and cool winds made perfect conditions. On Saturday morning a tour of the lake shore produced among other plants both the male and female trees of *Ilex monticola, Thymus serpyllum, Persicaria natans,* var. *Hartwrightii,* with their peculiarly ruffed ocreae, *Ophioglossum vulgatum Scirpus atrocinctus, Eleocharis palustris, Habenaria lacera, H. macrophylla, Najas flexilis, Isoetes braunii, I. riparia, Lycopodium tristachyum, L. inundatum, Equisetum fluviatile, Botrychium matricariafolium, B. lanceolatum v. angustisegmentum, B. dissectum, B. obliquum,* and the variety *oneidense, Polystichum braunii v. purshii, Dryopteris goldiana, Phegopteris hexagonoptera,* and the ripening fruits of *Trillium undulatum* and the pure blue berries of *Clintonia borealis.*

In the afternoon at Island Lake we saw *Lobelia dortmanna, L. cardinalis,* and the ripe spikes of *Orontium aquaticum.* At Scott Center we were too late for the annual display of thousands of *Pentstemon digitalis.* In a woods beyond we visited a bank of Lycopodiums, five species including *L. annotinum.* At a mountain bog

a few miles beyond we collected *Rynchospora alba, Coptis trifoliata, Andromeda glaucophylla, Epilobium lineare, Dryopteris spinulosa, D. cristata, D. boottii. Equisteum silvaticum, Alectoria chalybeiformis, Evernia prunastri, Cetraria juniperina,* and *Parmelia olivacea.*

The station for Braun's Holly Fern, *Polystichum braunii v. purshii,* furnished the event of the afternoon. In this bouldered ravine we saw the brilliant red berries of *Actaea rubra,* the pearl ones of *A. alba,* and collected *Cystopteris bulbifera, Camptosorus rhyzophylla, Phegopteris polypodioides, P. dryopteris, Dalibarda repens,* the leaves of *Oxalis acetosella* and *Hepatica acutilobata,* and *Circaea alpina.* Frequent gustatory sallies on the fruit of *Rubus strigosus* should also be chronicled.

Sunday morning a swamp nearby was visited to collect *Dryopteris clintoniana* from the only reported locality in Wayne County. Then a drive toward a bog near Lakewood, Pa., where were hundreds of *Sarracenia purpurea* in bloom along with the white spikes of *Habenaria blephariglottis.* This is a typical mountain bog filled with sphagnum and roots of *Kalmia caroliniana, K. polifolia, Andromeda glaucophylla* and the small cranberry, *Oxycoccus palustris.* Here was collected *Eriophorum virginicum* and the ripe *E. callithrix, Nemopanthus mucronata, Carex pauciflora, and Menyanthes trifoliata.* The edge of the bog was fringed with small trees of *Larix larcina.* The lower branches of these were fringed with a lacy pattern of *Parmelia physodes, P. olivacea,* and punctuated with the golden-banded *Cetraria juniperina.* Twigs were hung with tufts of *Alectoria chalybeiformis.* Other plants of the bog and surrounding swamp included *Calla palustris, Habenaria tridentata, Rosa carolina,* and *Cornus canadensis.* On the pasture land adjacent to the swamp there was enthusiastic search, and successful, for grape ferns at this southernmost range extension for *Botrychium multifidum.* Ten minute stops were made at Preston Center to collect the Ostrich Fern (*Pteritis nodulosa*), and at Little Hickory Lake where were seen *Dianthus deltoides, Galium verum, Eleocharis obtusa, E. acicularis,* and *Myriophyllum tenellum.*

Then to the station for *Thelypteris simulata* through a heavy ground cover of *Taxus canadensis.* The Massachusetts fern here covers quite a large area surrounded and at times almost completely hidden by shoulder-high fronds of *Osmunda cinnamomea.*

As this was primarily a fern trip, the results may be noted. Of the thirty-two species found here, aside from many varieties and forms, twenty-nine were collected, seven species of Lycopodiums, two Equisetums, seven Botrychiums, counting *oneidense,* two Isoetes, and *Ophioglossum vulgatum,* a total of forty-six ferns and fern allies.

W. L. Dix

Trip of October 13 to Branchville, Conn.

Eighteen members and guests were present on this trip which was made so popular in previous years by Miss Eleanor Friend, who unfortunately was not able to lead the trip this year. The famous quarry was visited and some of its interesting minerals were still to be found in spite of the depredations of innumerable collectors through the past several decades. Here it was interesting to note the differences between the common sugar maple and the black maple at this season. The leaves of the former were all golden or orange in hue and beginning to fall, while those of the latter were still pure green and fresh.

After climbing to the vantage point known popularly as Life Point, the party botanized in the deep woods and then the open fields and roadsides, identifying scores of species by their late fall characters. Of special interest were the late purple aster (*Aster patens*), the common hedge-mustard (*Erysimum officinale*), three species of wild-lettuce (*Lactuca spicata, L. canadensis,* and *L. sagittifolia*), the American Hercules-club (*Aralia spinosa*), green ash (*Fraxinus pennsylvanica*), and the downy rattlesnake-plantain (*Goodyera pubescens*). Along the highway splendid stands of black swallow-wort (*Cynanchum nigrum*), Japanese bittersweet (*Celastrus orbiculata*), and climbing hempweed (*Mikania scandens*) were observed, while many members were amazed to see the beautiful blue seeds of the spotted jewelweed (*Impatiens biflora*), which were pointed out.

After some discouragement in following a rather obscure trail, the party eventually reached Weir Lake, where the common cardinal-flower (*Lobelia cardinalis*) and Indian-tobacco lobelia (*L. inflata*) were still in bloom and bur-reed (*Sparganium*) and

American ditch-stonecrop (*Penthorum sedoides*) were conspicuous because of their fruit. Submerged in the lake was seen a considerable quantity of *Potamogeton epihydrus,* but the water-violet (*Hottonia inflata*), for which the lake is famous botanically, was not at all in evidence at this season. The smooth false-foxglove (*Aureolaria flava*) showed its fruit-capsules all through the woods, along with two species of *Chimaphila,* while various species of aster, goldenrod, and dodder were still in anthesis. Sickle-pod (*Arabis canadensis*) proved of special interest because of its characteristic fruit-pods. Common motherwort (*Leonurus cardiaca*) and catnip (*Nepeta cataria*) were still in flower. A splendid tree of white mulberry (*Morus alba*) was found in what was obviously a wild state, probably an escape from some nearby garden many years ago. The bright red and orange fruits of the common Indian-turnip (*Arisaema triphyllum*) and the American climbing bittersweet (*Celastrus scandens*) vied on the borders of woods with the crimson and scarlet leaves of the red and scarlet oak, sour-gum, and sumac.

H. N. Moldenke

NEWS NOTES

Word has been received from Switzerland that the Herbaria of the Muséum d'Histoire Naturelle, Paris, which after the outbreak of the war was divided among three castles near Paris for safe keeping, is in good condition and has been returned to the Muséum.

The herbaria of the department of botany of the British Museum together with original drawings, manuscripts and valuable books have been moved and stored in such a way that they will be as safe as possible but still may be consulted if necessary.

Mr. H. Guthrie Smith, New Zealand botanist and ornithologist, died on July 4 in his eightieth year. He was widely known for his books on the lives and habits of the rarer New Zealand birds and his graphic botanical history of his own sheep ranch. When in the United States in 1920 he visited at the New York Botanical Garden.

Dr. Joseph Burt-Davy of South Africa died on August 20. He was formerly demonstrator in forestry at the University of Oxford

and lecturer in tropical forest botany at the Imperial Forestry Institute of Shortover Furze. From 1903 to 1913 he was government agrostologist and botanist of Pretoria. He had previously served on the staffs of the Royal Botanic Gardens at Kew, of the University of California and of the United States Department of Agriculture.

Sr. J. P. Carabia of the Colegio La Sale in Havana, is spending a year at the New York Botanic Garden on a Guggenheim fellowship, working on the flora of Cuba.

Dr. Paul C. Mangelsdorf, formerly vice-director of the Texas Agricultural Experiment Station, is now professor of economic botany at Harvard and assistant director of the botanical museum which includes the famous collection of glass flowers. Professor Oakes Ames has retired from teaching but continues as director of the museum.

Chronica Botanica, formerly published in Holland, has been transferred to the New World and is now published in Waltham, Mass. Published every other Monday it "gathers all scientific, professional and personal news and comments which may help plant scientists (now over 80,000 in about 4,000 institutions) with their current work and new projects. It does not duplicate any of the 2,000 other plant science journals." The annual subscription, $7.50, may be sent to P. O. Box 151, Waltham, Mass.

The New England Museum of Natural History announces the Walker Prizes in Natural History for 1941. Two prizes, of sixty and fifty dollars, will be awarded for the best original unpublished essays on any subject in the field of plants useful to man. The closing date for submitting essays is May 1, 1941. Further information may be had from the secretary, 234 Berkeley Street, Boston, Mass.

WANTED—Torreya—*The Torrey Bulletin*

The Club has no copies of the January, 1940, number of the *Bulletin,* nor of the January-February Torreya. Several of each of these are needed to complete sets. If any members of the Club

have copies they can part with, the treasurer will be very glad to receive them and to pay for them at the advertised prices.

A Correction

In our May-June number we referred to Professor Harley H. Bartlett as from the University of North Carolina. He is professor of botany at the University of Michigan.

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John Torrey, 1796-1873

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TORREYA

Vol. 41 January-February, 1941 No. 1

A Tribute to Mr. George Tracy Hastings

During the last twenty years Mr. Hastings has been a most effective editor of TORREYA. Anyone who has looked over the publications of TORREYA cannot leave them without a feeling that a great deal of work and energy went into the pages of this journal. Editing TORREYA was a pleasure and a labor of love that he thoroughly enjoyed.

Mr. Hastings' undergraduate work was carried on at Cornell University and for two years after he was a graduate assistant in botany at his Alma Mater. For some period of years he was a teacher at a Mission School in Santiago, Chile. One of his early publications was "Notes on the Flora of Central Chile" in Volume 6 of the *Plant World*. This was followed by a contribution, "Observations of the Flora of Chile," published in the *Bulletin* of the Torrey Botanical Club in 1905. After a year of teaching at Winona, N. J., he joined the staff of the Philadelphia Commercial Museum as an economic botanist and carried on graduate work at the University of Pennsylvania.

Mr. Hastings entered the DeWitt Clinton High School as a teacher in biology in 1910 and remained in this position until he entered war work with the Y. M. C. A. On his return from service he entered Evander Childs High School and carried on graduate work at Columbia University which honored him with an M.A. degree. With the opening of the new Theodore Roosevelt High School on Fordham Road he was made head of the department of biology and carried on in this position until his retirement in 1940. Mr. Hastings was a member of Sigma Psi. The pages of TORREYA give eloquent proof of the many contributions he made to the field of botany.

Mr. Hastings not only led trips for the Torrey Botanical Club but organized an extensive field course in biology for teachers in the New York area. These field trips helped materially in the edu-

cation of biology teachers. Many of the teachers who served under his guidance attest to his splendid leadership and breadth of knowledge in the field that he chose for his life work. Students who worked under his direction are loyal in their praise of the man who was strict but sympathetic when occasion demanded. He seldom if ever lost his pleasing personality regardless of how good an excuse he might have had for expressing his opinions rather forcibly.

For nearly thirty years he has been active in the field work of the Club, and interested in its scientific and material welfare. His love of plants is so well expressed by the field trip (announced elsewhere in this issue) for any member who will be in California this year. Excerpts from a letter to Dr. B. O. Dodge which was read at the first fall meeting further attest to the affection that he had for the Torrey Club. He regretted his inability to lead his scheduled field trip and attend the fall meeting. He mentioned the plants blooming in California, his week at the sea shore and the walking sticks made of Pacific kelps for sale in the curio shops. His closing was a hope that the coming year will be a very prosperous one for the Club.

We extend the best wishes of the Torrey Botanical Club to you, Mr. Hastings, and to Mrs. Hastings and may you enjoy to the fullest the joys of a well-earned rest.

Wm. J. Bonisteel
John W. Thomson

Fellowship: $1,000 to $1,500 Stipend.—Applications and reference statements must be received before March 15, 1941 to be considered by the Board authorized to make the 1941-1942 award of this first Sigma Delta Epsilon Fellowship celebrating the twentieth anniversary of the founding of the organization.

Women with the equivalent of a Ph.D. degree, conducting research in the mathematical, physical, or biological sciences, who need financial assistance and give evidence of high ability and promise are eligible. During the term of her appointment the appointee must devote her entire time to the approved research project, and not engage in other work for remuneration (except in instances where written approval of the Board shall first have been obtained). Application blanks may be secured from Dr. Nina E. Gray, University, Normal, Illinois. Announcement of the award will be made early in April.

Report of the Local Flora Committee

II. Agrimonia

The accompanying plate[1] illustrates a leaf and details of stem-pubescence of each of the following species:

A. gryposepala Wallr. Pl. I, fig. 4. A northern species extending southward to Long Island (where it appears to be the commonest of the agrimonies), northern Staten Island, and infrequently in New Jersey south to Somerset County. The pubescence is characterized by short stipitate glands as well as by rigid long hairs.

A. rostellata Wallr. Pl. I, fig. 3. A southern species, extending to Plattsdale, L. I. (*Ferguson*); Middletown and Kent, Conn., and to Westchester County, N. Y.

A. pubescens Wallr. (including *A. Bicknellii* (Kearney) Rydb.). Pl. I, figs. 2, 5. Abundantly represented in the herbaria from Long Island and adjacent Westchester County, with scattered specimens from Putnam and Ulster Counties; apparently common in the northern half of New Jersey, but there are no specimens from Sussex County.

A. striata Michx. Pl. I, fig. 1. A northern species extending south to Glen Cove and Cold Spring Harbor, L. I.; represented in New Jersey from Sussex, Union, Middlesex, Hunterdon, and Monmouth (at Marlboro) Counties.

A. parviflora Soland. Pl. I, fig. 6. Essentially southern, but known on Long Island only from Glen Cove and Cold Spring Harbor. There are several collections from Staten Island and Bronx County; also specimens from White Plains, Nyack, Yonkers and from Hamptonburgh, Orange County. Otherwise *A. parviflora* seems to be unknown from the Torrey Club range in southern New York. It is widely distributed in New Jersey, but there are no specimens from Sussex, Warren, Morris, Hunterdon, Mercer, or Middlesex Counties.

The stem of *A. striata* is bristly-hairy, without glands; in *A. pubescens* the pubescence is soft-velvety; in *A. rostellata* the stems are nearly glabrous with numerous short-stalked glands and scattered bristle-hairs; in *A. gryposepala* both glands and bristle-hairs are abundant; lastly, *A. parviflora* is easily recognized by the

[1] Drawn by Miss Maud H. Purdy of the Brooklyn Botanic Garden.

Explanation of Plate I

Fig. 1. *Agrimonia striata,* Batchellerville, N. Y., *F. Mulford.*

Fig. 2. *A. pubescens* (=*A. mollis* (T. & G.) Britton), Queens, L. I., *Wm. Ferguson.*

Fig. 3. *A. rostellata,* Plattsdale, L. I., *Ferguson no. 597.*

Fig. 4. *A. gryposepala,* Yaphank, L. I., *N. Taylor.*

Fig. 5. *A. pubescens* (=*A. Bicknellii* (Kearney) Rydb.), Deer Park, L. I., *Ferguson.*

Fig. 6. *A. parviflora,* Yonkers, N. Y., *M. Holtzoff.*

Leaves × ½; sections of stem enlarged.

numerous leaflets and very bristly stems. Good specimens of *A. rostellata* and *A. pubescens* show the peculiar tuberous-thickened roots which offer the best means of identification.

Distributional maps within the Torrey Club range, based on specimens in the local herbaria of the New York Botanical Garden (where the maps are now filed) and the Brooklyn Botanic Garden, have been contributed by Miss Rusk, Dr. Gleason, Mr. Logan, and Miss Ora Smith.

III. Quercus

The following notes cover only a few localized species within the area of the Torrey Botanical Club:[1]

Q. stellata Wang. (Post Oak). Apparently of scattered distribution throughout Long Island, and known from the adjacent shore of Westchester County and along the Connecticut coast; Staten Island; rather frequent in southern New Jersey, extending north to Somerset and Essex Counties. Reported by Taylor (Flora of the Vicinity of New York, p. 279) as rare and local in Bergen and Hudson Counties and questionably from Warren County.

Q. prinoides Willd. (Chinquapin Oak). Scattered in New Jersey and abundant in the barrens of Long Island. Otherwise in the New York area only from Chester, Orange County.

Q. marylandica Muench. (Black Jack Oak). Represented from Suffolk and Nassau Counties, L. I.; from Staten Island; from Middlesex County southward in New Jersey.

Q. Phellos L. (Willow Oak). Staten Island and in New Jersey from Middlesex County southward.

Q. palustris Muench. (Swamp Oak). Apparently not east of Nassau County on Long Island; frequent in New Jersey and extending up the Hudson Valley to New Baltimore and Cairo in Greene County. The limit of range in southern New York is not clear.

IV. Ranunculus[1]

Only a few of the numerous species of the buttercups or crowfoots are here recorded:

R. micranthus Nutt. This is essentially a hairy-stemmed *R. abortivus,* known chiefly from the central and southern states. Its only stations in southern New York (with the exception of

[1] Distribution maps made by Mr. George H. Peters and Mr. Louis E. Hand are on file at the New York Botanical Garden.

Fishers Island) seem to be in southern Westchester County. There are representatives in the local flora herbaria from the northern counties of New Jersey south to Somerset County.

R. SCELERATUS L. Chiefly a coastal species but represented far inland at Newton and Hamburg in Sussex County, N. J. The elongated heads are somewhat similar to those of *Myosurus*.

R. OBTUSIUSCULUS Raf. (*R. laxicaulis*). Not represented from Long Island, nor elsewhere east of the Hudson River in New York State; occasional along the Connecticut coast; Staten Island; becoming fairly abundant in northeastern New Jersey. There are no specimens from Sussex County.

R. PUSILLUS Poir. A slender introduced species represented from Westchester County and from a single station (Woodmere) on Long Island; Staten Island; Morris, Union and Middlesex Counties in New Jersey.

V. VIOLA

The violets (especially the blue-flowered species) are a notoriously difficult group which cannot always be accurately identified by the treatments of our manuals. The following notes include only a few species of special interest, based, with the exception of *V. rotundifolia,* entirely on the specimens in the Local Flora Herbarium of the New York Botanical Garden.[1]

V. ROTUNDIFOLIA Michx. This yellow-flowered violet is perhaps the earliest of all the species to flower. It is represented from Queens County, L. I. (hb. Brooklyn), and from Staten Island (hb. Brooklyn); of scattered distribution in northern New Jersey (although no specimens are present from Sussex County); known from a few localities in Westchester County and a single collection from Orange County, then strangely missing between these points and the Catskill Mountains of Greene and Delaware Counties.

V. BLANDA Willd. A dwarf plant of moist woodlands, with white flowers which are not fragrant. It is often confused with the fragrant white violet (*V. pallens*) of wet swamps and pond shores, but is quickly recognized by the hairy upper surface of the leaf. *V. blanda* is represented in the Local Flora Herbarium by collections from Nassau and Queens Counties, L. I.; Staten Island;

[1] Distribution maps made by Miss Rusk, Miss Ora Smith, Miss Friend, Miss Dolores Fay, and Mr. Logan are on file at the New York Botanical Garden.

and from scattered points in northern New Jersey from Middlesex County northward, although there are no specimens from Passaic County. It appears to be abundant in Westchester County, and there are two specimens from eastern Orange County; otherwise the species is not represented in southern New York until the mountains of Ulster, Greene, and Delaware Counties are reached.

V. PRIMULIFOLIA L. Generally distributed on Long Island and Staten Island, but not otherwise represented in New York except in southern Westchester County. No specimens from Passaic, Essex, Somerset, or any counties to the westward in New Jersey.

V. LANCEOLATA L. Range almost identical with that of *V. primulifolia* except that specimens are represented from Passaic and Essex Counties in New Jersey.

V. STONEANA House. Middlesex County, N. J.; otherwise represented only from Montgomery and Chester Counties, Pa.

V. BRITTONIANA Pollard. A coastal species represented from western Suffolk County, L. I., and abundantly in Nassau and Queens Counties; also on Staten Island. In New Jersey there are specimens from Union, Middlesex, Mercer, Monmouth, and Ocean Counties.

V. FIMBRIATULA Sm. Perhaps the commonest blue violet of our area in dry soil, yet there are no specimens from Sullivan, Dutchess, or Columbia Counties, nor are there any from south of Monmouth County in New Jersey.

HENRY K. SVENSON, *Chairman*

WITHIN THE last few years several paper mills have been established in our southern states. These mills utilize slash pine in the preparation of craft paper which is largely used in the fabrication of boxes and for wrapping paper. Four of these mills produce a total of 1,200 tons of paper a day. Since it requires about two cords of pulp wood for one ton of paper it means a daily requirement of 2,400 tons of pulp wood. The cellulose present is suitable for chemical treatment in the specialized industries if the occasion should ever arise.

Local Flora Notes

Jasione and Croton

Jasione montana L. Many recent reports, collections by both amateurs and professional botanists, and my observations of this campanulacious weed indicate that it is firmly established in our local area. Of the regions outside the Torrey range there are two representatives in the Britton Herbarium of the N. Y. Bot. Gd. from Conanicut Island, R. I.: J. F. Collins (1895) and ex herb. W. M. Canby (1899). The former collector, in an article in the Bull. Torr. Bot. Club 23: 212, 213 (1896), records that the Sheep's-bit had been observed for at least five years, and that it covered several acres. The author adds these New England stations: Reading, Mass. (only a few plants, fide W. H. Manning), and a doubtful station at Boston Back Bay Fens. Scorgie, in Rhodora 4: 199 (1902), reports a single plant at Wareham, Mass. "The Catalogue of the Flowering Plants and Ferns of Connecticut" by L. Andrews and others (1910), reports it in Plainfield (a few plants) and in East Lyme. Two New York City records are dated 1879; Eighth Avenue and Harlem River, Manhattan; Hunter's Point, L. I. Both ballast collections are by Addison Brown, who reported them in the Bull. Torr. Bot. Club 6: 357 (1879). These two records, like that from Girard Point, Philadelphia (collected on ballast by Isaac Burk, probably about the 60's), are historical; within the city limits I saw last year a few stray specimens of Jasione in the Springfield Gardens section of Queens. It grows more abundantly a short distance east, at Valley Stream. The material from Long Island at the N. Y. Bot. Gd. is all from Suffolk Co.: Laurel, June, 1925, Ferguson #3912; Oakdale, July, 1933, M. M. Kennerly, Shinnecock Hills, June, 1938, Moldenke #10625; Hampton Bays, August, 1938, Muenscher & Curtis #6511; Southampton, September, 1938, Monachino. But my Long Island observations of this adventive have been in all its counties, appearing either as waifs or, not infrequently, in large conspicuous colonies of exclusive and vigorous growth.

The Sheep's-bit is no less ambitious in New Jersey. Bayard Long, in Rhodora 21: 105-108 (1919), "*Jasione montana* a conspicuous weed near Lakewood, N. J.," reports "at least a dozen distinct stations . . . . some of thousands of plants, some of few" near

Lakewood. He adds that it has thoroughly adapted itself in some places and has the appearance of a native plant; farmers thereabouts, he comments, told him that the "Blue Weed" had been frequent at Lakewood for twenty-five years and was elsewhere in Monmouth County. The Lakewood station is substantiated in the herbarium of the N. Y. Bot. Gd. by Baldwin (July, 1918) and E. G. Barnhart (June, 1921). Monachino #341 (August, 1937) was collected at Lakehurst, Ocean County, where in conspicuousness it perhaps superseded that described by Bayard Long some twenty years ago; and in no less profusion, I have also observed several stations of *Jasione montana* in Burlington County.

Croton glandulosus L. The stations in the vicinity of Philadelphia for this Euphorbiaceous species have been long known. A. M. Ferguson, in "Crotons of the United States" (1901), page 52, writes, "A form, reported as common below the Navy Yard, Philadelphia (Diffenbough, 1864; Martindale, 1865; and Parker, 1866, 1867, on ballast ground), is *C. glandulosus scordioides* (Lam.) Muell. Arg." In 1921, Bayard Long, Rhodora 23: 221, 223, refers to these old stations and includes the collections from Newcastle, Del. (1866, a single plant only), and that from Kaighn's Point, Camden, N. J. (1865, 1866). He continues, "The last collection appears to have been in 1879, from ballast grounds in Philadelphia." Bayard Long proceeds to report his observations near Atco, Camden County, N. J., where he saw many hundreds of vigorous plants of the Glandular Croton. On September, 1937, I collected my #381 (deposited in the Local Herb. N. Y. B. G.) near Barnegat, Ocean County, N. J., where it was flourishing in a huge colony of ripe-seeded *C. glandulosus var. septentrionalis* Muell. Arg. form of the species.

JOSEPH MONACHINO

NEW YORK BOTANICAL GARDEN.

WINGS AT MY WINDOW by Ada Clapham Goven (Macmillan Company) is a true bird story with an intensely interesting human background. Birds need natural woodland and plants that give them shelter and food. Protecting the birds provides for a more adequate balance of nature. We need more books of this kind.

A Recent Study of the Orchid Flora of Connecticut

H. M. Denslow

During eight years beginning in 1932, the undersigned, with the help of a few friends, notably Mr. Alton C. Pawsey of Glastonbury, has made an intensive study of the orchids now growing wild in Connecticut. It seems well to make a record of the results. The nomenclature with one obvious exception, the inclusive genus Habenaria, is that of Britton and Brown, Illustrated Flora, Second Edition, 1913.

There are 169 townships in the state. All have been visited and explored, some three and four times, a few more frequently. Some observations and collections have been made in the winter months.

The species most widely distributed and apparently the most abundant is *Peramium pubescens* (Willd.) McM.; this has been collected in all but two towns, which are cities, Bridgeport and New London. No record has been found of its previous detection in either of these towns.

Second in distribution and abundance is *Cypripedium acaule,* Ait. Next *Ibidium cernuum* and *Isotria verticillata* are abundant and widely distributed; the former *chiefly* in moist roadside banks, often in grassy swamps, and occasionally in open woods; the latter under various conditions of soil and association; seldom solitary and often in large colonies; one in the town of Burlington contains by actual count more than 1,000 vigorous plants.

The yellow Cypripediums are not common but are found, occasionally in large colonies, in scattered townships, in some of which they have persisted for many years. *C. hirsutum* is disappearing gradually in a large swamp in Canaan. *C. arietinum* has not been found *yet* in the state.

Hartford County, which includes much of the rich river valley and other favorable habitats, supports a much greater number of species than any other county, namely thirty-two of the forty-two recognized in the state; in an area of about one-seventh of the state, including a little more than one-sixth of the 169 towns.

Fairfield County has the smallest number, thirteen, naturally, since the shore towns are more thickly settled and include many "estates." Of the fourteen genera reported for the state all are represented in Hartford County and one, Serapias, is not found in any other.

The amphigaean genus Habenaria is well represented in the state, but in number of species, twelve, rather than in frequency or distribution. *H. bracteata, H. flava, H. hyperborea* are found occasionally; *H. clavellata,* the most widely distributed of the genus, is in thirty towns and in every county except Fairfield. It is found usually, not invariably, in small colonies in shallow, temporary pools in open woods, or on the borders of sluggish brooks.

H. orbiculata is found, sparingly except in Hartland, in nearly all the towns of the northern border. *H. Hookeriana* is frequent on one hill in Ellington and is found occasionally in four of the eight counties of the state, both northerly and southerly.

There are in the state five species of the fringed Habenarias, *H. lacera* being the most widely distributed, *H. cilaris* probably the most abundant in individuals though occurring in gradually reduced numbers in three shore towns; it has been detected also in an open field in Moodus, Middlesex County, about sixteen miles inland. *H. blephariglottis* was abundant in a thicket in South Windsor, but is disappearing rapidly. It has been reported from five other towns. *H. psycodes* occurs infrequently in all parts of the state, quite as often in open, low woods as in fields or swamps, never in large groups. *H. fimbriata* is even less frequent, is found chiefly in Hartford County. *Orchis spectabilis* is well distributed in four inland counties and abundant in one town in Litchfield County.

All three species of Peramium are found in one wood in Woodstock. *P. pubescens* is in almost every town as noted above. *P. tesselatum* is well distributed in the northerly sections and is sometimes abundant, notably in Norfolk. Its anthesis is sometimes ended as that of *P. pubescens* in the same locality is beginning.

Arethusa is vanishing; there are small groups in Glastonbury and Litchfield and, it is reported, in Pomfret. Twenty years ago it was in Thompson also. Fifty years ago it was abundant in Hamden.

Limodorum and *Pogonia ophioglossoides* are abundant in widely separated places, occasionally in damp roadsides, never, it seems, both found in large numbers in the same swamp. In one very wet bog in Marlboro, there are hundreds of *Pogonia,* very few *Limodorum;* in a grassy swamp in Simsbury near the other corner of Hartford County, the reverse is true, *Limodorum* being even more abundant.

Liparis Loeselii is infrequent, and not abundant except in one roadside bank with clayey soil, in Glastonbury. *L. liliifolia* is in forty-eight towns, in all counties; but chiefly in Hartford and New Haven Counties, infrequent in each of the others.

The three coralroots of the Eastern States are found in Connecticut; *C. trifida* is very rare, *C. maculata* is in nearly half of the towns, chiefly in Hartford and New Haven Counties, never abundant except in a bank beside an old woodroad in Woodstock, Windham County, where Mr. B. J. Pawsey found a colony of more than seventy on August 29, 1939. *C. odontorhiza* is seldom found except in Hartford and New Haven Counties. Usually there is a solitary plant or a very small group. Eight years ago there was a colony of over 100 in a low open thicket in West Hartford, but many have disappeared.

Serapias Helleborine L., the energetic species, which has spread so fast and far in New York State in the last forty years and is known also in Pennsylvania, Vermont, District of Columbia, Wisconsin and Ontario, was discovered about ten years ago in West Hartford and seems to be well established.

Aplectrum hyemale has almost disappeared; so has *Triphora trianthophora*. The two species of Malaxis are vanishing—fewer than twenty plants of *M. unifolia* have been seen by the writer in eight years and in three counties.

There are three towns, Oxford, Southington and Glastonbury, in each of which more than twenty species are well established. In some limited areas, orchids abound, in species and numbers. In one open wood, which includes some low places, in Glastonbury, fourteen species have been counted; on Soapstone Mountain in Ellington, twenty species, including *Isotria affinis, Malaxis unifolia* and the three coralroots and representing ten of the fourteen genera found in the state. Nearly all these same genera are found also in Oxford, Southington and Glastonbury, but not in such limited areas.

Of eleven species, *Orchis spectabilis, Cypripedium acaule* and *C. parviflorum, Habenaria Hookeriana, H. orbiculata, H. lacera, H. psycodes, H. fimbriata, H. clavellata, Liparis liliifolia, Isotria verticillata,* good specimens with capsules have been collected in the winter months. Of the *Isotria* it has been observed that the

leaves do not persist unless there is fruit, but with the capsule all five leaves are present occasionally.

In the City of Hartford, in Keney Park, *Cypripedium acaule* is abundant in one section, *Peramium pubescens* still persists, and until recently *Ibidium cernuum* was growing in an open tract, near the southern border, which has since been "improved."

This paper is in no sense a revision of the Orchid flora of Connecticut. It is the record of a study in distribution and abundance. Incidentally, information has been obtained in regard to periodicity and natural causes of disappearance. In any season there are many more blossoming plants than fertile capsules but some species do not depend chiefly on the seeds for propagation. Like *Malaxis paludosa* they have other methods.

To sum up, it is evident that the orchid *family* is not in danger of extermination in Connecticut. Some inconspicuous species are reduced in numbers and distribution; more showy ones are protected by public opinion or by statute; others, like *Habenaria clavellata* or either *Liparis,* are not likely to be noticed by the casual wanderer in the woods. By many the whorled pogonia would be supposed to be Medeola and *Ibidium gracile* would not even be seen.

New London County calls for fuller investigation. So do Windham and Litchfield Counties. The hopes have not died which dream of finding within our borders *Cypripedium arietinum* and *Habenaria obtusata.*

Hartford, Conn., May, 1940.

Great Britain is faced with a shortage in the crude drug market of such items as deadly nightshade (*Atropa belladonna*), thorn apple (*Datura stramonium*), henbane (*Hyoscyamus niger*), foxglove) (*Digitalis purpurea*), lavender (*Lavendula vera*), and rosemary (*Rosemarinus officinalis*). Several large drug farms exist in England and production is being increased. Test plots of the drug items mentioned have been maintained in this country and if necessary suitable acreage can be developed for any demand that might be made. Economic plants that yield essential oils will be needed in this country for a shortage already exists.

Henry Hurd Rusby

With the passing of Dr. Rusby, at the age of eighty-five, on November 18, 1940, the Torrey Botanical Club loses its oldest member. It was in 1879 that the distinguished plant collector and pharmacognocist became a corresponding member of the Club. At the time of his death he was an honorary life member. He is survived by his wife, Mrs. Margaret Hanna Rusby, three daughters, two brothers and a sister.

Educated in the rural districts, botany became an interest early in life. In 1876 he won the prize for the best herbarium at the Philadelphia Centennial. The plants were collected from his own beloved New Jersey and were well within the range of the Torrey Club. Though educated as a physician he did not practice medicine but early turned to teaching and became a professor of botany and materia medica and later was dean of the Columbia University College of Pharmacy until his retirement in 1930. During part of this time he also taught at the New York University School of Medicine and at the New York Veterinary College.

He conducted five botanical explorations to South and Central America in search of economic plants, many of which were new to science. He carried on extensive surveys in the study of the Cinchonas. It is estimated that he collected 45,000 specimens during his life time. Most of the type specimens are deposited in the herbarium of the New York Botanical Garden.

Dr. Rusby was president of the Torrey Botanical Club for several years. It was but natural that Dr. Rusby should early in life come in contact with Dr. N. L. Britton and together they were very active in the establishment of the New York Botanical Garden. For many years he was chairman of the Board of Managers and Honorary Curator of the Economic Collections.

The study of plants led to food and drug investigations that lasted throughout Dr. Rusby's entire life. Working with Dr. Wiley they were the real instigators in the passage of the first Food and Drugs Act. After the passage of the Act Dr. Rusby served for some time as pharmacognocist for the Port of New York and as such established an effective control over nearly all the imports into this country.

The list of publications, which included books, travels, and taxonomic descriptions, is long and cannot be included in this short tabulation. He was the recipient of many honors throughout his long and active life. He was Hanbury Medallist in 1929, a unique honor bestowed by the Pharmaceutical Society of Great Britain, and one of his choice possessions.

For fifty years Dr. Rusby exerted a profound influence upon pharmaceutical education in this country. He was a dominant character and if the principle of the subject was right he was an untiring fighter. Students benefited from his influence, although it must be confessed that at times he strayed from his subject and ventured into the fields of intellectual philosophy, "for the good of the cause," as he aptly expressed it.

Very few people in the Torrey Botanical Club ever had the privilege of collecting with Rusby. The writer was fortunate enough to enjoy many days in New Jersey when Rusby was nearing the seventies. Rests were frequent and those half hours spent in the shade of a tree were moments when one could really get close to Dr. Rusby. These trips were in the nature of "escapes" from a routine that administrative work demanded. It was regrettable that time did not permit him to write a text on the flower behavior of the plants in this area. His information was gained through actual observation in the field and his knowledge on this subject was vastly superior to that which has appeared in textbooks to date. Though practically his entire life was spent in undergraduate teaching it has always seemed a pity that some far-sighted administrative head did not pick Dr. Rusby and put him in with graduate contacts in the fields of cytology and genetics where without doubt he would have anticipated many of the discoveries that have occurred in the last two decades.

Wm. J. Bonisteel

Alginic acid has long been known but it is only in recent years that the production of sodium alginate has assumed commercial importance. Sodium alginate enters into the production of ceramics, plastics, and as a binder in the paper industry. It is used as an emulsifier, in the treatment of waste waters and is an important constituent of cosmetic preparations.

A California Trip by Mr. Hastings

Dr. John A. Small, chairman of the Field Committee, in a recent letter from Mr. Hastings, has been offered a series of field trips for any member who may be in California this coming year. Dr. Small hopes that other members will offer similar trips when away from the local flora area.

Mr. Hastings suggests that he will be glad to arrange trips if notified in sufficient time. One suggestion is a trip to the Huntington Library with special attention to the gardens with the finest collection of cacti and succulents in the West, together with many fine palms, cycads and other interesting plants.

Another suggestion is a trip to the famous Rancho La Brea Tar Pits, now a city park, for a study of the pits, their fossils and some of the cultivated plants in the region. Mr. George T. Hastings may be reached at 842 19th Street, Santa Monica, Calif.

BOOK REVIEWS

Flora of the Hawaiian Islands

New Illustrated Flora of the Hawaiian Islands—Book 4. Otto Degener. Degener, Waialua, Oahu, T. H., or Dr. H. N. Moldenke, New York, Botanical Garden, New York City, 1940. 324 pages. $3.50. (The same price as Books 1, 2 and 3.)

George T. Hastings

Here is a unique work on the flora of a large area, published in parts with no effort to complete the work for families or genera in systematic order, but describing species apparently according to their availability or abundance. In each volume describing 100 species the arrangement is by families, from number 1, the Ophioglossaceae, to number 344, the Compositae. For each species a full page is used, on one side a plate showing the habit of the plant, single flowers and such details of structure as may be of most importance to an understanding of the species, the other side of the page gives the names, scientific, English and Hawaiian, and synonyms, description with greater detail than in most floras, the type locality, local range, and for plants not native to the islands, the extra range. The commercial use and the part played in the culture of the ancient Hawaiians is also given, often in considerable detail. Thus each page is complete for one plant. In each volume there are included some botanical descriptions of families and genera and

keys to the local species. A temporary index concludes the volume. As the pages are not numbered the index refers to the numbers of the families which are printed in the upper corners of the pages. Such pages as the table of contents and index bear letters instead of numbers. The present index lists all the plants described in the four volumes already published and also those described in the author's Plants of Hawaii National Park, published in 1930.

The books are bound in cloth, the loose leaves held by screws that are easily removed. Directions with the book advise taking the volumes apart and rearranging the pages by the numbers of the families, then arranging the genera and species alphabetically in the families, and rebinding in convenient units.

The plates, made under Mr. Degener's supervision by artists he has trained, are practically all from living specimens, are attractive and accurate and make positive determination of the species easy. Apparently volumes are to appear as rapidly as the plates can be made. The magnitude of this undertaking can be understood when we consider that there are at least 2,500 species of ferns and flowering plants in the islands for each of which a plate is to be drawn and the description written.

Book 1 was published in 1933, 2 in 1935, 3 in 1938 and this last volume in 1940. Each new volume increases the value of those already published. It is hoped that the succeeding volumes will appear in an accelerated rate that the whole flora of the islands may be available to botanists and visitors to the islands. The parts so far completed describe a large number of the plants most commonly seen and will do much to increase the pleasure of visitors to the islands who are interested in plants and are essential to botanists making a study of the flora.

One disadvantage of this method of writing a flora is, as suggested, that the pages cannot be numbered, another obvious one is that for some time only a few of the species in larger genera can be described. In the Plants of Hawaii National Park, for example, it is stated that there are over sixty kinds of Bidens in the islands of which two introduced and four native ones are found in the park and mentioned in this work. In the first three books eight species were described, fifteen more are taken up in book four, evidently some forty more wait description. The great advantage of the method is the appearance of the parts years in advance of the time

when the whole work can be completed. Another advantage is that if changes or corrections are necessary or new species described the new pages can be inserted in their proper places. The temporary indices of the first three volumes are to be discarded now, that of the present volume replacing them. Degener has been in the islands since 1922, has travelled extensively in all the large islands and employs several collectors to help him in the work. Many of his specimens have been deposited in the herbarium of the New York Botanical Garden.

Desert Wild Flowers

Desert Wild Flowers. Edmund C. Jaeger. Stanford University Press. XII + 322 pages. 1940. $3.50.

George T. Hastings

To many of us the word "desert" originally suggested a barren sandy waste, possibly the Sahara as pictured in our elementary geographies, where nothing could grow, except in the rare oases. Though we have outgrown these early ideas and know that many plants are adapted to live in the desert, it may come as a surprise to find 764 species described from the deserts of California. Quite as much of a surprise, possibly, to know that cacti "are abundant only in places where water supplies are seasonally plentiful" and cannot grow at all in the driest parts of the desert.

Edmund Jaeger is an authority on the biology of the California deserts; his The California Deserts published seven years ago was followed by Denizens of the Desert—now these are supplemented by Desert Wild Flowers. Like the former volumes, this is a popular work for those visitors to and residents of southern California interested in knowing the plants they see. There are no keys nor scientific descriptions, instead there are outline drawings of practically all the plants, mostly made from living material in the field during the twenty-five years that the author has been exploring the Mohave and Colorado Deserts. He suggests that users of the book carry indelible colored pencils to color the illustrations of the plants they find. In addition to the drawings there are photographs of some of the trees and shrubs and of the cacti. Incidentally, these photographs give a fair idea of several types of desert country. Naturally where there are closely related species in a genus, determination by drawings alone may be uncertain. In these cases the

brief descriptions will help. Instead of technical descriptions there are interesting notes on the biology and ecology of the species, their use by the Indians, their relation to birds, insects and other desert animals. The meanings of the scientific names are given and the English or common names are given, or, in the majority of cases, as the plants have no common name, one is supplied, often an English form or translation of the scientific one. To the reviewer this seems unnecessary. Anyone who can distinguish between the species can learn the scientific name as easily as the manufactured "common" one.

As an example of the treatment of species we select one of the fourteen species of Saltbush, *Atriplex Torreyi* (Gr. "not" + "to nourish"—because it robs the soil, also the Latin name for "orache"; John Torrey). "Principally a Nevada species extending southeast to the Mohave Desert of California and east to southwestern Utah. The gray-scurfy branches and sharply angled twigs make up large, almost impenetrable bushes 3-6 ft. tall. . . . Dr. John Torrey, a New York botanist, specialist in mosses, in whose honor Sereno Watson named this plant, was the describer of many of the species collected by Frémont in western deserts. He visited California in 1865, collecting in the region about Santa Barbara and in the Sierra Nevada." In the same way biographical notes are given for 150 others whose names are commemorated in genus or species names.

The scientific names used (without citation of authority or synonyms) are "for the most part those used by Munz in his Manual of Southern California Botany," which means that Dr. Jaeger is conservative in his ideas as to genera and species.

The volume is attractive and admirably adapted to its purpose of a popular handbook of desert plants. The professional botanist will find it a desirable supplement to the standard manuals with much of interest about the plants omitted from these more technical works.

What Are the Vitamins?

What Are the Vitamins? Eddy, Walter H., Reinhold Publishing Corporation. 1941. 247 p. $2.50.

Wm. J. Bonisteel

Thirty years ago Funk discovered a crystalline substance in extracts from rice polishings and the story of vitamins was launched.

Even prior to this date scientific workers clearly indicated that factors were present in food other than carbohydrates, fats and proteins. Within the last five years interest in vitamins has become widespread and the general public have many questions that they want answered. The book by Dr. Eddy, long a worker in vitamin research, answers these questions in a straightforward manner. Scientific accuracy has been maintained throughout the volume.

Vitamins are intimately tied up with plants for in nature these organic chemical compounds occur in natural foodstuffs. The advance in vitamin knowledge occurred when these substances were isolated in pure form and their chemical structure determined. With definite chemical entities science could determine their function and rôle in living organisms. Many of these substances have been made synthetically in the laboratories. Twelve vitamins have been chemically identified and their functions clearly demonstrated.

The author indicates the method of naming the vitamins and explains their chemical nature in a carefully selected appendix. The information about vitamins is understandable to one who may not have a great deal of technical knowledge. Throughout the book the painstaking research that was necessary to bring order out of chaos is vividly described.

A considerable number of vitamins have been postulated on the physiological reactions that they show. These substances have not as yet been isolated or determined chemically. Included in this group are the anti-grey hair factor, Centanni's digestive factor, the grass juice factor and about a dozen other factors. Their rôle in human economy can only await the results of further research.

For proof of vitamin activity one only has to compare a picture of a group of school children of 1900 and 1940. It is clearly established that certain vitamins must be present in food or given otherwise if we are to prevent rickets, scurvy, pellagra and other existing deficiencies. Certain facts are still lacking on how the vitamins are able to protect an individual from these conditions. In one chapter the relation of certain of the vitamins to intracellular respiratory enzymes is introduced. The processes of oxidation, hydrogen carriers, coenzymes, cytochromes and carboxylases are explained so as to give one an idea of how some of the vitamins function in cellular activity.

The general treatment in the book is to consider each of the well-known vitamins separately. Their occurrence in foodstuffs is listed and in the appendix the distribution of each vitamin in foods is tabulated. The properties of the vitamins is given in considerable detail. This is a very valuable part of the book for it gives the basis of the experiments conducted, the findings and in many cases charts and formulas are used for brevity.

The human need for each vitamin is given. Each chapter is concluded with a short but carefully selected bibliography for those who wish more details. The literature in the field is very extensive and the choice of titles used is excellent. The lesser known vitamins are considered in the light of their present knowledge.

The tables with vitamin values are useful. Each foodstuff is tabulated in terms on International Units (their equivalents are given elsewhere in the book) or in micrograms in the case of riboflavin. Another distinct advance is listing the materials as average portions served. The equivalent weight in ounces and grams permit all to use the tables. Each portion is then listed with the vitamin unit that is given by that food portion. Any one can use this information in the preparation of diets. One must not be unmindful of the fact that soil conditions, methods of marketing and various processes used in preparing foods may affect vitamin values. The tables are based upon average expectancies under normal conditions.

Given the proper carbohydrates, fats, proteins, vitamins and minerals every organism can carry on at its maximum efficiency. Deprive that organism, whether man or fungi, of the necessary elements and you have a deficiency condition that lowers its potential effectiveness against disease. Vitamins are essential in preventive medicine and health. Certainly in courses of botany vitamins deserve more attention than they now receive. Teacher, student, housewife, and general reader may learn much from this volume. The author has given the best summation yet published. The publishers have given an easily read book. Both have made a real contribution to a fuller understanding of the vitamin problem.

FIELD TRIPS OF THE CLUB

Trip of July 13-14 to the Beaverkill

Eleven members and friends of the Club met at the Rice House, Livingston Manor, on the afternoon of July 12. A short trip was taken along the Willowemoc Creek in the early evening. On Saturday the party drove twenty miles along the Beaverkill in the Catskill Mountains to the 2,316-foot level near the Balsam Lake Club entrance. A trail of four miles led to the entrance of the swampy area which is headwaters of the stream between Double Top Mountain and Graham Mountain.

Aconitum noveboracense was found growing within fifty feet of the crests of Double Top Mountain in the springy ground that is found on the western slope. A splendid view of the Beaverkill watershed may be obtained at the peak, which is 3,905 feet high. The day was clear and excellent views of the other peaks were possible. The top of the mountain has an excellent stand of balsams. On the return trip the party crossed over the headwater of the stream on the west bank and found one exceptional stand of aconites, American Jacob's ladder and the white bog orchis.

The walking trip was about fifteen miles over rough trails and took eleven hours. This trip extends the range of this aconite from above Roscoe to the crest of Double Top. An additional note on the aconite range is being prepared. The usual "botanical seminar" was held on Saturday evening.

Sunday Mr. Crabtree led a trip to the falls on the Willowemoc and to his summer home on the shores of Hunter Pond. From the balcony one is afforded an excellent view of the surrounding country. A cranberry bog was visited and a trip was made to Mud Pond, which is one of the typical quaking bogs in this region. Dr. Camp and Dr. Small collected many specimens. Mr. Nearing reported a new lichen that he discovered.

Wm. J. Bonisteel

Report of Torrey Trip, August 18, 1940

Nineteen members of the Torrey Club and the Newark Museum Nature Club enjoyed the trip to Ocean and Burlington Counties. We found an abundance of *Schizaea* near Chatsworth. There were a few *Habenaria blephariglottis* left, though most of them had faded. The *H. integra* was just coming into bloom and the stand at

Sim's Place shows no sign of failing. One lone specimen of *H. cristata* was found at the same place. At West Creek we found numbers of *Sabatia dodecandra* and were surprised at a large number of *Lobelia cardinalis* growing in the marshes east of the town. These marshes must be quite salty. A stop was made at Barnegat to call on Barnegat Pete, the famous deer. He was very friendly but refused to be quoted for publication.

VERNON L. FRAZEE

TRIPS OF AUGUST 24 AND 25 TO THE WATCHUNG MOUNTAINS

Thirty-six members and guests were present on these two trips to a region which has been visited sixteen times by the Club under the same leadership during the past seven years. Among species not seen on previous trips were *Veronica scutellata, Andropogon glomeratus, Centaurea nigra, C. maculosa, Desmodium nudiflorum* f. *foliolatum, Bilderdykia cristata, Polygala ambigua, Agastache nepetoides, Stenophyllus capillaris,* and *Euonymus americanus.* A recent shift in the names of two common species of love-grass was pointed out—what we formerly called *Eragrostis purshii* is now *E. pectinacea,* while what we called *E. pectinacea* is now more properly *E. spectabilis*—the latter a particularly appropriate name for this showy "tumbleweed" grass. Twelve species of goldenrod were identified, only the first in full anthesis—*Solidago juncea, S. nemoralis, S. canadensis, S. flexicaulis, S. ulmifolia, S. rugosa, S. altissima, S. bicolor, S. squarrosa, S. patula, S. caesia,* and *Euthamia graminifolia.* Differences were pointed out between three true mints, *Mentha gentilis, M. piperita,* and *M. spicata;* two dodders, *Cuscuta coryli* and *C. gronovii;* four bush-clovers, *Lespedeza procumbens, L. capitata, L. virginica,* and *L. frutescens;* three sumacs, *Rhus glabra, R. typhina,* and *R. copallinum;* and seven kinds of tick-trefoil, *Desmodium paniculatum, D. canescens, D. rotundifolium, D. nudiflorum, D. grandiflorum, D. laevigatum,* and *D. obtusum.* Both the white and blue vervains were seen in abundance. *Apocynum cannabinum* var. *pubescens* was found as well as the typical form of the species, and the very fragrant broad-leaved *Koellia* (*Pycnanthemum*) *virginiana* as well as the practically scentless narrower-leaved *K. flexuosa.* Three skullcaps were found—*Scutellaria integrifolia, S. ovalifolia,* and *S. lateriflora,* the two former past flowering and fruiting, the last in full bloom. Among other interesting flowering plants studied were the New York ironweed

(*Vernonia noveboracensis*), Deptford pink (*Dianthus armeria*), common blue-curls (*Trichostema dichotomum*), wineberry (*Rubus phoenicolasius*), black maple (*Saccharodendron nigrum*), American lopseed (*Phryma leptostachya*), common mud-plantain (*Heteranthera reniformis*), common sneezeweed (*Helenium autumnale*), square-stemmed rose-pink (*Sabbatia angularis*), clustered beak-rush (*Rynchospora glomerata*), slender knotweed (*Polygonum tenue*), Virginia three-seeded mercury (*Acalypha virginica*), spotted milk-purslane (*Chamaesyce supina*), orange-grass (*Sarothra gentianoides*), downyleaf arrow-wood (*Viburnum rafinesquianum*), broadleaf arrowhead (*Sagittaria latifolia*), and squarrose sedge (*Carex squarrosa*).

Among the showiest plants were the erect butterfly-weed (*Asclepias tuberosa*) and extensive colonies of dense gayfeather (*Liatris spicata*) and American Culvers-root (*Veronicastrum virginicum*). Other milkweeds seen were *Asclepias pulchra, A. incarnata, A. syriaca,* and *A. verticillata.* Dense pure-stands of *Hypericum mutilum* which had invaded the cleared ground around the bases of a row of cultivated maples caused much comment. Other St. Johnsworts seen were *H. boreale, H. perforatum,* and *H. punctatum.* Four aralias were observed—*Aralia nudicaulis* and *A. racemosa* native in the woods, *A. spinosa* widely naturalized, and *A. chinensis* in cultivation. Other escapes were *Broussonetia papyrifera* and *Symphoricarpos rivularis.* The finding of *Andropogon furcatus,* as well as two more species of milkwort, *Polygala verticillata* and *P. viridescens,* proved a surprise to most of the party.

Mr. Nearing collected and identified a goodly number of fungi, including *Amanita phalloides, A. frostiana, Amanitopsis vaginata, Tricholoma rutilans, Clitocybe amethystina, Laccaria laccata, Collybia radicata, Camarophyllus cantharellus, Hygrophorus conicus, Hyrocybe coccineus, Lactaria piperata, L. lactiflua, L. subdulcis, L. theiogala, Russula virescens, R. foetens, R. emetica, R. mariae, R. flavida, R. nigricans, Cantharellus cibarius, C. cinnabarinus, C. minor, Pleuropus obesus, Ceriomyces viscidus, Fistulina hepatica, Schizophyllus alneus, Stereum rameale, S. sericeum, Clavaria cinerea, C. aurea, Scleroderma vulgare, S. bovista,* and *Irpex lacteus,* as well as the puffball—*Lycoperdon gemmatum,* and the polypores—*Lenzites betulina, Coriolus abietinus, C. versicolor, Coltricia cinnamomea,* and *Daedalea confragosa.* A number of these proved

to be new records for the observed flora of this area, which now comprises 1,722 different identified species and varieties.

HAROLD N. MOLDENKE

REPORT ON TRIP TO MT. EVERETT, MASS., SEPTEMBER 7-8, 1940

Four things contributed to a successful trip: fine weather, a varied and beautiful terrain, excellent food at the farmhouse of Mr. and Mrs. Hunt and the presence of Dr. Svenson and Miss Rusk who lent expert assistance to the amateur leader. Seventeen people attended the trip.

The first day was unusually clear with beautiful cloud effects so our party visited the Dome. This is the summit of Mt. Everett, next to Greylock the highest point in Massachusetts. Along the trail a few hundred feet below the summit we saw *Acer pennsylvanicum* and *A. spicatum, Sorbus americana, Aronia melanocarpa, Viburnum alnifolium, Nemopanthus mucronata* and *Rubus* sp.—the last four with berries. At the summit we admired the picturesque contortions of *Pinus rigida,* its form effected by the high winds at that altitude. The dominant ground cover at the summit was *Potentilla tridentata* (the three-toothed cinquefoil) and *Vaccinium pennsylvanicum.* Everybody enjoyed picking the delicious ripe blueberries. Late in the afternoon we descended some 800 feet to Guilder Pond. This pond is surrounded by the natural beauty of hemlock woods and its shores lined with *Amelanchier, Kalmia, Myrica Gale* and *Virburnum alnifolium.* Many berries still remained on the *Cornus canadensis, Clintonia borealis, Mianthemum canadense,* and *Smilacina racemosa. Castalia odorata* was in full bloom and *Eriocaulon,* probably *articulatum,* was seen in the water.

Saturday evening the leader showed some of his natural color photographs of plants in this region.

The second day the party descended to Bash Bish Falls, a wild mountain gorge on the border of Massachusetts and New York. In the forest around the falls the following were noted in flower: *Eupatorium urticaefolium, Impatiens biflora, Helianthus divaricatus, Polygonum sagittatum, Prenanthes alba, Mentha gentilis, Desmodium nudiflorum* and *D. grandiflorum, Amphicarpa monoica, Collinsonia canadensis, Rubus odoratus, Hieracium scabrum, Bidens bipinnata* and various asters. The following were in fruit:

Aralia racemosa, Ceanothus americanus and the beautiful pink and green keys on *Acer spicatum.*

RUTHERFORD PLATT

TRIP OF SEPTEMBER 13-15, 1940, TO SHAWANGUNK MOUNTAINS

We had two days of fine weather in which to enjoy the beauties of the Shawangunk trails. The names of Millbrook Mountain, Gertrude's Nose, the Palmaghatt, Minnewaska Lake, Fly Brook Swamp, Rainbow Falls and Lake Awosting will briefly outline the route for those who know the country.

There were no additions to the 1938 list of plant species but the following could well be mentioned again: *Corema Conradii, Ilex monticola* in abundant fruit, *Woodwardia virginica, Hypericum canadense, Rhodora canadensis,* and *Dryopteris simulata.* Some chestnut burs on 20-foot sprouts were noted. Witch hazel was in bloom.

Since the September, 1938, Torrey trip to Rainbow Falls the leader has questioned an identification made on that trip. A correction is now necessary. In that report (TORREYA, January-February, 1939, page 21) *Drosera intermedia* was noted. This species proved to be *Drosera rotundifolia.*

A Marsh Hawk and several unidentified accipters and buteos were seen over Millbrook on their way to Hawk Mountain. Bear scat was found on a ledge above the Palmaghatt.

DANIEL SMILEY, JR.

TRIP OF SEPTEMBER 28, 1940, TO SPRAIN RIDGE

Eight members and guests of the Club enjoyed a clear, sunlit, autumn day strolling through the Boyce Thompson Arboretum grounds along Sprain Ridge.

Botanizing began immediately on descent from the trolley at Nepperhan Avenue. The roadside yielded *Solidago juncea, S. speciosa, S. rugosa, S. graminifolia, Aster cordifolius, A. cricoides, A. salicifolius, A. novae-anglae, Bidens frondosa,* and *B. vulgata.* Close to the arboretum *Solidago canadensis* was identified along the road. Many of these same species of aster and goldenrod were also common in the arboretum. *Hieracium Gronovii* with its long-hairy leaves was examined closely and the abundant glandular hairs on the stem and inflorescence noted. Silver-rod, *Solidago bicolor,*

and *S. caesia* and *Aster divaricatus* were seen along the path. Belated flowers of Black-eyed-susan, *Rudbeckia hirta,* Oxeye Daisy, *Chrysanthemum leucanthemum,* and Butter and eggs, *Linaria vulgaris* were still common, and Self-heal, *Prunella vulgaris,* was in full bloom. Along the road a solitary Blue Lobelia, *Lobelia siphilitica,* and a few Turtleheads, *Chelone glabra,* grew in moist places.

Lunch was eaten in a clearing amid the pungent scent of crushed pennyroyal. Yellow-eyed grass, *Hypoxis hirsuta,* and the Slender Gerardia, *Gerardia tenuifolia,* were found here in blossom. On the return trip *Solidago latifolia* was added to the list. Large clusters of Dodder flowers and fruit were common on it. Nearby, the strong lemon odor of crushed Horse Balm, *Collinsonia canadensis,* called attention to itself and to its inconspicuous yellow flowers. A few plants of *Aster sagittifolius* were growing on the west-facing slope of Sprain Ridge. All members of the group sampled the butternut flavor of the seeds of the Orange Touch-me-not, *Impatiens biflora,* which was also in abundant blossom. Along a clay bank at the side of Sprain Road several teachers in the group collected the abundant prothallia of the Lady fern, *Athyrium angustifolium,* for use in their classrooms.

John W. Thomson, Jr.

Trip of October 18-20, 1940, to Mohonk Lake, N. Y.

Forty-one members and friends attended this trip. Saturday and Sunday were spent enjoying the beauties of this great mountain estate. Autumn coloring was especially brilliant this year, and the clear, crisp air enhanced the distant views. One of the highlights of the trip was the lunch at Bonticou Camp. The "kettle was boiled" and everything, from crackers and cheese to bananas, was toasted over the crackling flames. In mid-afternoon two hay wagons met the walkers at Bonticou Crag.

A description was given of the "why" and "how" of autumn coloring with examples collected along the way. The leader demonstrated the use of the increment borer in the study of tree growth and described its part in determining a plan of forest management. The Mohonk greenhouse had a good display of chrysanthemums as well as other interesting plants. Thanks are due to Mrs. A. Keith Smiley, Jr., who led two shorter walks to observe shrubs and trees in autumn condition.

Daniel Smiley, Jr.

PROCEEDINGS OF THE CLUB

Minutes for the Meeting of May 15, 1940

The meeting of the Torrey Botanical Club held at the New York Botanical Garden on May 15, 1940, was called to order by the President, Dr. B. O. Dodge, at 3:30 P.M.

Twenty-five persons were present.

The minutes of the meeting of May 7 were adopted as read.

Mrs. Mary E. Slavin, Doubleday Doran & Co., 14 West 49th St., New York City, and Mr. Paul Frese, 70 East 45th St., New York City, were elected to annual membership.

Mr. Devereux Robinson, Hudson View Apartments, 183rd St. and Pinehurst Ave., New York City, was elected to associate membership.

The resignations of Prof. T. C. Frye, Department of Botany, University of Washington, Seattle, Wash., and Miss Elizabeth T. Ojerholm, 807 East 14th St., Austin, Tex., were reported with regret.

The scientific lecture of the afternoon was presented by Dr. E. B. Matzke of Columbia University. The speaker's abstract follows:

In 1682 Grew likened cells to the "froth of beer or eggs," and since that time there have been frequent comparisons between the shape of cells in tissues and that of bubbles in foam. Throughout the nineteenth century, from Mirbel in 1802 through Gray in 1887, cells were thought of commonly as twelve-sided, like compressed spheres in "cannonball stacking," though Bernhardi and Duchartre considered them fourteen-sided. Carrying in mind the investigations and deductions of Plateau on soap films, of Kelvin on the division of space, and of Thompson on the form of cells, Lewis studied carefully the three-dimensional shape of 250 cells in undifferentiated tissues—pith, fat tissue, and precartilage—and found that they had an average of 13.97 faces. He concluded that such cells have an average of fourteen faces and that they approximate the fourteen-sided figure of Lord Kelvin, of which eight sides are hexagonal and six are square. More recently Marvin has very carefully studied and modeled 100 *Eupatorium* pith cells, which have an average of 13.37 faces and are roughly divisible into two groups, the larger with slightly more than fourteen sides, the smaller with slightly fewer.

Analyzing the shapes by compressing lead shot, Marvin found that such shot, of uniform size, varied in number of faces from 8.41 to 14.16, depending on the extent to which "intercellular" spaces were eliminated, while the peripheral shot had 10.75 sides as an average. Other investigations disclosed that when small shot are mixed with large and compressed, the small shot have fewer than fourteen contacts, the large more than fourteen.

More recently, investigations have been made on the three-dimensional shape of bubbles in foam, using a technique by which the volume of each

bubble is precisely the same and central as well as peripheral bubbles in a mass may be studied in three dimensions. The average number of faces of 225 peripheral bubbles is 10.98, corresponding closely with the data on peripheral shot, and with the average of eleven faces found for epidermal cells by Lewis; the average number of faces of 300 central bubbles of a mass is 13.69, approximating the results of Lewis and Marvin on cells, and also the data on the lead shot. No one "type" that is "ideal" or most commonly approached has been found. Pentagonal faces occur most often in the bubbles.

Contact and pressure systems, illustrated by the lead shot, and surface tension systems, illustrated by bubbles in foam, have marked similarities in shape to cells in undifferentiated tissues.

Respectfully submitted,

CLYDE CHANDLER
Recording Secretary

MINUTES OF THE MEETING OF OCTOBER 1, 1940

The meeting of the Torrey Botanical Club held at the Brooklyn Botanic Garden on October 1, 1940, was called to order by the President, Dr. B. O. Dodge, at 8:30 P.M.

Fifty-one members and friends were present.

The minutes of the meeting of May 15 were adopted as read.

Fourteen candidates were elected to annual membership: Dr. Robert S. Adamson, The University, Capetown, Union of South Africa; Dr. Carrolle E. Anderson, 55 Kilburn Rd., Garden City, L. I., N. Y.; Dr. Edward J. Backus, Biology Building, University of Wisconsin, Madison, Wis.; Dr. C. E. B. Bremekamp, Ostadelaan 14, Bilthoven, Netherlands; Miss Katherine Carr, Morehead State Teachers College, Morehead, Ky.; Dr. José Cuatrecasas, Instituto Botanico, Apartado 2535, Bogotá, Colombia; Mr. Julian Francis Detmer, "Edgemont," Tarrytown, N. Y.; Dr. Hiroshi Hara, Botanical Institute, Faculty of Science, Tokyo Imperial University, Tokyo, Japan; Dr. E. J. Kraus, Department of Botany, University of Chicago, Chicago, Ill.; Mr. Sami Rafei, Department of Botany, Oregon State College, Corvallis, Ore.; Dr. Harold A. Senn, Division of Botany, Central Experimental Farm, Ottawa, Ont., Canada; Dr. Aaron J. Sharp, Department of Botany, University of Tennessee, Knoxville, Tenn.; Miss Sara J. Stewart, 64 Linwood Rd., New Rochelle, N.Y.; and Dr. Nils E. Svedelius, Kyrkogårdsg., 5 A, Uppsala, Sweden.

Thirteen candidates were elected to associate membership: Miss Anna W. Clark, 719 Madison Ave., Scranton, Pa.; Mr.

Alfred Stanley Conyes, c/o 12th Floor, 148 Lafayette St., New York, N. Y.; Miss Julia E. Davison, Botany Department, Rutgers University, New Brunswick, N. J.; Miss Ethelwyn Doolittle, 317 West 45th St., New York, N. Y.; Mrs. Adolph Elwyn [Frances E.], Mount Airy Rd., Croton-on-Hudson, N. Y.; Mr. David Gottlieb, 1333 Boynton Ave., Bronx, N. Y.; Dr. George H. Hallett, Jr., 3353 82nd St., Jackson Heights, L. I., N. Y.; Mrs. George H. Hallett, Jr. [Ruth D.], 3353 82nd St., Jackson Heights, L. I., N. Y.; Mr. Walter J. Harmer, Hotel Orleans, 100 West 80th St., New York, N. Y.; Mr. Theodor Jakovleff, 862 Caldwell Ave., Bronx, N. Y.; Miss Kathryn L. Roller, 252 West 75th St., New York, N. Y.; Mrs. S. S. Vanderbilt, 527 West 121st St., New York, N. Y.; and Mr. W. D. Vanderbilt, 527 West 121st St., New York, N. Y.

Two resignations from annual membership, Miss Dorothy V. Smith, 31 Hoffman Rd., New Hyde Park, L. I., N. Y., and Miss Pauline Young, Department of Botany, Texas University, Austin, Tex., and one resignation from associate membership, Mr. Emanuel Lopez, 217 West 138th St., New York, N. Y., were accepted with regret.

The death of two members, Dr. Andrew J. Drushel, 209 Edgewood Ave., Westfield, N. J., on June 20, who had been an annual member of the Club since 1927, and Mrs. Richard M. Hoe, 11 East 71st St., New York City, a sustaining member since 1906, was reported.

As is the usual custom of the Torrey Club, this first meeting of the fall was devoted to reports of its members on their field trips and collecting experiences during the summer. The extensive travels of a large number of the members afforded an unusual wealth of material for these reports.

The meeting adjourned at 9:50 P.M., after which delightful refreshments were served by the Brooklyn Botanic Garden.

Respectfully submitted,

Clyde Chandler
Recording Secretary

Minutes of the Meeting of October 16, 1940

The meeting of the Torrey Botanical Club held at the New York Botanical Garden on October 16, 1940, was called to order by the President, Dr. B. O. Dodge, at 3:30 P.M.

Twenty-three persons were present.

The minutes of October 1 were adopted as read.

Eighteen candidates were elected to annual membership: Mr. Libero Ajello, 1006 Furnald Hall, Columbia University, New York, N. Y.; Dr. Fred A. Barkely, Montana State University, Missoula, Mont.; Mrs. Albert C. Barnes, Merion, Pa.; Mrs. D. C. Boyce, 4214 Bigelow Blvd., Pittsburgh, Pa.; Dr. Myrle M. Burk, R. F. D. No. 2, Waterloo, Iowa; Mr. Virginius H. Chase, 107 Park Pl., Peoria Heights, Ill.; Dr. Lincoln Constance, Botany Department, University of California, Berkeley, Calif.; Dr. Frederick L. Fagley, 60 Gramercy Pk., New York, N. Y.; Dr. John E. Flynn, Biological Abstracts, University of Pennsylvania, Philadelphia, Pa.; Mrs. Grace B. Griffeth, 41 Lake View Pk., Rochester, N. Y.; Miss Sarah H. Harlow, 56 Hancock Ave., Yonkers, N. Y.; Mr. Howard K. Henry, Haverford College, Haverford, Pa.; Dr. John Austin Jump, State Teachers College, Frostburg, Md.; Mr. John Masek, Apopka, Fla.; Mr. W. Stanley Myers, 818 Eubanks St., Oklahoma City, Okla.; Mr. George A. Orrok, 21 East 40th St., New York, N. Y.; Mr. William Slater, 1060 Morewood Ave., Pittsburgh, Pa.; and Dr. George James Wilds, Hartsville, S. C.

Three candidates were elected to associate membership: Miss Phyllis M. Busch, 229 East 18th St., Brooklyn, N. Y.; Miss Cay Hillegas, 7 St. Luke's Pl., Montclair, N. J.; and Miss Dorothy E. Wheatley, 29 South Munn Ave., East Orange, N. J.

Dr. John Leutritz of the Bell Telephone Laboratories spoke on the preservation and biological materials. The speaker's abstract follows:

Telephone equipment is exposed to a wide variety of environmental conditions. Many of the materials of biological origin such as cotton, paper, jute, rubber and wood used in communications systems are exposed to a variety of living organisms which will cause their degradation and subsequent interruption of service. The major research has been carried on to ascertain suitable preservatives by field and laboratory assays for protecting these materials, especially from damage by fungi and termites.

Sporadic attacks by organisms such as carpenter ants, "fire ants," limnoria, toredo, ground squirrels, field mice and cockroaches have presented minor problems to the biologists in the Bell System.

Respectfully submitted,

Clyde Chandler
Recording Secretary

NEWS NOTES

Mr. G. G. Nearing, of Ridgewood, N. J., has been awarded the Jackson Dawson Memorial Medal by the Massachusetts Horticultural Society for his work with rhododendrons. Mr. Nearing is the author of several articles on lichens that have been appearing in TORREYA.

Registration for adult classes in the Brooklyn Botanic Garden show a total for the year of 1,642. This is more than twice the number in 1939 and is the largest registration in the history of the garden.

The department of landscape architecture of Columbia University has been given Glencoe, a seven-acre estate at Irvington, N. Y., by Mr. and Mrs. John W. Donaldson, of Millbrook, N. Y. This estate was a part of holdings of the Alexander Hamilton family. Glencoe borders upon Nevis, a sixty-eight-acre estate given to Columbia in 1935. The additional grounds will be incorporated into Nevis Arboretum for the use of the students in landscape design.

Prof. E. S. Heath, of Atlanta, has been made director of the new Georgia Botanical Garden which includes a tract of about 450 acres being developed just outside of Atlanta. A survey of the species in the area is now under way.

The two millionth specimen was deposited in the herbarium of the New York Botanical Garden on December 11, 1940. The plant having the accidental honor of being number 2,000,000 was collected by Dr. H. A. Gleason during the previous summer at Russelville, Ky., and is the little known wild clematis, *Clematis versicolor*. After a short program given by staff members the incorporation of the species into the herbarium was concluded by Joseph Rockwell Swan, president of the board of managers.

Science reports that the council of the Royal Horticultural Society, London, has awarded the Victoria medal of honor for 1940 to Major F. C. Stern. The Veitch Memorial gold medal has been awarded to T. Hay, former superintendent of the royal parks, and the Loder rhododendron cup to Dr. J. Hutchinson, of the Royal Botanic Gardens, Kew.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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OF THE

TORREY BOTANICAL CLUB

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A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 66, published in 1939, contained 668 pages of text and 27 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–66 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

Volume 19, no. 1, 92 pages, 1937, price $1.50. Volume 19, no. 2, 178 pages, 1938, price $2.00.

(3) INDEX TO AMERICAN BOTANICAL LITERATURE

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

WILLIAM J. BONISTEEL

John Torrey, 1796-1873

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Floral Abnormalities in Linaria vulgaris

With Notes on a Method by Which New Genera May Arise

W. H. Camp and Charles Gilly

It is not unusual for zygomorphic (irregular) flowers to exhibit some form of abnormality by becoming partially or even completely regular. One of the more commonly observed types is that wherein flowers normally with one corolla spur produce five-spurred forms. This phenomenon was observed by the early botanists but seems to have been first given a name by Linnaeus.[1] He called it *Peloria,* meaning a prodigy or monster, a term derived from the Greek and applied to the abnormal forms of various flowers, particularly those of Butter-and-Eggs, *Linaria vulgaris* Hill,[2] with five spurs and five stamens. Masters[3] in his extended

[1] Linnaeus C. De Peloria. Pp. [vii] 18 [iv]. 1 plate. Upsala. 1744. Except for the various dedications and closing poetry, this is a dissertation written by Linnaeus and "defended" by one Daniel Rudberg before the faculty at Upsala. We were fortunate to have in the Library of the New York Botanical Garden a rare original copy of this thesis, and wherein the plate differs markedly from that of the more generally quoted and certainly better illustrated Amoenitates Academicae, at least that of the 1787 [3rd] edition which is before us. The texts of the two are essentially the same, thus explaining the difficulty one has in reconciling the plate of the Third Edition with its legend. It is also of interest to note that, here, peloria was considered a genus, although it was clearly recognized as consisting of abnormal states of various genera. Considering that this was written only nine years prior to the publication of the Species Plantarum, we can realize the state of flux in which the nomenclatural concepts of Linnaeus were during this period, for by 1753 he dropped peloria as a genus.

[2] *Antirrhinum Linaria* of Linnaeus' Species Plantarum, 1753.

[3] Masters, Maxwell T. Vegetable Teratology. London, 1869.

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treatment of vegetable abnormalities has given us a rather full account of peloria (pp. 219–239) and distinguishes several types.

A plant of *Linaria* preserved in spirits and exhibiting various forms of peloria was recently brought to us for examination by Mr. Estil Kermit Handley (Figure 1). It was collected in a vacant lot on the west side of Garden Avenue between East Fifth Street and Sandford Boulevard, Mount Vernon, New York, in July, 1940. Mr. Handley kindly gave us permission to make a more detailed study of his specimen. At the same time we examined the specimens of the species on deposit in the herbarium of the New York Botanical Garden and found additional types of abnormalities, the more important of which are discussed in this paper.

In the normal flower of *Linaria vulgaris,* five nearly regular sepals are present. The five corolla segments are fused, their outer ends being represented by five lobes, two of which form the upper lip and the remaining three the lower. The spur is on the middle of the three segments forming the lower lip. The four functional stamens are didynamous and partly fused to the base of the corolla, the fifth being represented either by a minute vestigial structure or is absent, no evidence of it having been found in certain instances, even under the higher powers of the microscope.[4] It is the stamen whose position would lie between the two lobes of the upper lip of the corolla which has been suppressed. The ovary is two celled, the septum being nearly in a plane with the split between the lips of the corolla. (For details see Figures 10a–c, 11.)

It will scarcely be necessary to take up in any great detail the various forms encountered in this study. The Handley specimen from Mount Vernon, New York, indicates that there is, necessarily, no sudden change from the normal to the peloric state. Instead, it is quite likely that there may be a gradual shifting of physiological gradients both within the developing inflorescence

[4] In this study we have had no opportunity to make any detailed observations either of the vascular supply or modulus of variation of stamens within any great number of what otherwise—and from their external appearance—would be considered normal flowers. However, in a series of plants from various localities we have noted a tendency for one or both of the shorter pair of stamens to be either longer or shorter than usual; also, that the pattern of the vascular supply of those flowers which have no remnant of a fifth stamen is somewhat different from those which have it, at least in that portion of the corolla adjacent to the abortive stamen.

and individual flower so that there are successive stages in the development of complete peloria.[5] For example: one flower (Figures 2a-c) was normal except for small spurs on the lateral corolla segments of the lower lip, the fifth stamen being represented by a minute tab of sterile tissue attached to the base of the corolla. Another (Figures 3a-c) was essentially the same, except that the fifth stamen, although smaller than any of the others, bore two pollen sacs. In complete peloria (Figures 4a–e) five spurs and five equally developed stamens are present.

As has been mentioned in the brief description of the normal flower, the single spur is found on the middle one of the three segments of the lower lip. It may also be noted in the normal flower (Figure 10c) that it is the lower lip which is refolded, forming the thickened labium characteristic of this portion of the corolla. Partial peloria (as Figures 9a–b) may have a somewhat narrowly tubular corolla with the lips reduced. Where peloria is fully developed, all five segments of the corolla bear spurs; also the apex of the corolla has the double fold (*i.e.,* of a type characteristic of only the lower lip in the normal form) present and involving all five segments (see Figures 4d–e). Apparently those factors which are involved in the production of the middle segment of the lower lip of the normal flower, with its spur and refolded labium, have become active in all five segments of the corolla. It is also interesting to note that this example of complete peloria had five equally developed stamens and a tri-carpellate ovary and thus, by a strict interpretation of the generally accepted family characters, could not remain in the Scrophulariaceae with the other flowers of the same inflorescence.

It is outside the province of this paper to more than speculate on the origin and evolution of various flower forms, but abnormal material such as this will undoubtedly present various clues useful in the ultimate untangling of many of our phyletic concepts. In *Linaria,* it is obvious that the fifth stamen, instead of being eliminated by the advent of zygomorphy has only been suppressed, for it takes but little disturbance of the normal ontogenetic pattern to reproduce the structure in a completely normal form. This, then,

[5] For an account of the difficulties met in an attempt to fix the hereditary condition of peloria in *Linaria,* see De Vries, The Mutation Theory, English Ed. Vol. 2: 201-220. 1910.

brings up the following problem: Was the primitive form from which the modern *Linaria* evolved one with five spurs, or did the normally single spur evolve after the onset of zygomorphy? The present writers are inclined toward the latter viewpoint.[6]

Other flowers on the Handley specimen (as Figure 5 with its bifurcate spur and Figures 6a–8c with supernumerary anthers and incomplete peloria) are of interest if only to indicate the potentiality for plasticity of ontogenetic variation within the developing organs of a single individual. It will be noted (particularly in Figures 6a–8c) that there seems to be a spatial relationship between the production of functional supernumerary anthers and the development of supernumerary spurs. The external views and floral diagrams of these flowers will be self-explanatory.

During our examination of herbarium material we came upon a series of specimens collected by R. Hitchcock near Van Cortlandt Park, New York City, in June, 1909. Although no two flowers of this collection were exactly alike, it was unusual in that the various ones examined had the same general types of abnormalities: they were smaller than is normal for *Linaria vulgaris*; the spur was lacking or but poorly developed; the corolla, although bilabiate, was irregularly erose; and, still more remarkable, in addition to the four normal stamens, additional rudimentary stamens or anther pouches were found (see Figures 12a-14e). In every case these were attached to or partly imbedded in the tissues of what ordinarily would have been the lower of the two corolla lobes (*i.e.,* the one composed of three corolla segments, the middle one of which ordinarily would have borne the spur).

There is but little point in discussing this phenomenon without having worked on the living material, but studies some years ago by the senior author on other species (principally *Cannabis sativa,* the results of which are not yet completely published) indicated a close relationship between a disturbance of the normal sequence of metabolic rates within developing flower primordia and the production of such monstrosities. It is to be here noted as

[6] The reader will undoubtedly think of analogous problems, as for example in the Ranunculaceae where *Delphinium* has one of the perianth segments produced into a spur, or in *Aquilegia* where spurs are found on five perianth segments (although admittedly in a different cycle from that of *Delphinium*). The genus *Aconitum* is also subject to peloric forms.

a corollary that a definite morphological gradient exists in the normal flower of *Linaria:* the upper (adaxial) stamen is suppressed, the next two stamens are intermediate in length, and the lower (abaxial) stamens are longest; the lower lip of the corolla has the greatest marginal hypertrophy (as shown by its refolded labium) and it is also from the middle of its three segments that the spur is produced. Obviously it is this abaxial segment of the developing flower primordium which is normally most active, both physiologically and ontogenetically. Also it is in (or on structures produced by) this region where we find the greatest number of abnormalities which, in the final analysis, are only visible proofs of unusual physiological activities resulting in abnormal morphological structures.

Of further interest was a series of specimens collected by John McCallum, near Morris Park, Long Island, in 1912. It involved a series of plants exhibiting several types of peloria, including both spurless and multiple-spurred forms. Of these we will consider only one flower (Figures 15a–c). Here the spur was absent; also there was good evidence that the middle segment of the lower lip of the corolla had been lost, each lip, therefore, consisting of two corolla segments. Substantiating the view that one entire segment of the flower was lacking was the fact that the calyx had but four segments, with no evidence of fusion between lobes; also the flower bore but three stamens. When one compares the diagram of this flower (Figure 15c) with that of a normal flower (10b), it is obvious that, in addition to one sepal and one corolla segment, one of the abaxial stamens had been lost. Thus, there was achieved an essentially tetramerous flower modified only by its inherent zygomorphy, and this evident by a residual bilabiate condition.

Going outside the Torrey Club Area for material, we have a series of plants collected by William Scott at York Mills, near Toronto, Canada, September 18, 1911. Judged only by the flowers, this material could by no stretch of definition be placed in the genus *Linaria,* although there was no mistaking the plant's habit. The flowers were almost completely regular, with four sepals, four corolla segments, two anthers and a two-carpelled ovary (Figures 16a–c). The collector's notes state that it "grows in great profusion in at least four localities within about five miles of Toronto. . . . . I think it does not set seeds but propagates itself simply from

root stocks. There can be no doubt that it is established here for this is the second year that I have seen it and I could collect a waggon load of it if necessary."

It is quite likely that the material was sterile, as noted by the collector, and that it depended on vegetative reproduction for survival. Knowing nothing of the cytology of this particular group of plants, one can do no more than speculate on its origin. However, it is safe to assume that the variety of characters in which it differed from the normal form was not due to a single-gene mutation, but involved a series of more drastic changes—none of which was lethal to a plant able to propagate itself vegetatively, as did this plant, forming a series of clones.

Plate I

FIGURES 1–9b. LINARIA VULGARIS HILL

Figures 1–8c. Collected by Estil K. Handley, Mount Vernon, New York, July, 1940.

1. The single plant showing the various flower types.

2a. External view of a flower bearing two small lateral spurs; 2b, its floral diagram indicating the presence of four functional stamens and one vestigial stamen, as shown in 2c, the details of the reproductive organs.

3a-b. External view and floral diagram of a flower similar to the above, but with the fifth stamen somewhat more developed and bearing two pollen sacs. The details of the reproductive organs of this flower are shown (in 3c) enlarged.

4a–e. The completely peloric flower. 4a, external view; 4b, its floral diagram, the five spurs, five stamens and tricarpelled ovary may be noted; 4c, median section; 4d, external view of the apex of the corolla; 4e, median section showing its refolded lip.

5. Flower with bifurcate spur.

6a–b. Flower with two well developed spurs and one small spur. A supernumerary stamen was present between the larger spurs but the "fifth" (adaxial) stamen was represented only by a tab of sterile tissue, much as in Figure 2c.

7a–b. A flower essentially similar to the preceding, but differing in having the floral pattern reversed; also the "fifth" stamen bore a two-celled anther, much as in Figure 3c.

8a–c. Face and lateral views, and diagram of a flower with three spurs and six stamens; the "fifth" stamen was fully developed and the supernumerary stamen was attached to the receptacle opposite the median spur. Here the flower was assuming a balanced symmetry.

9a–b. A specimen from the Torrey Herbarium (locality and collector unknown but probably by John Torrey in the vicinity of New York City). Here, two spurs had been developed; also, the apex of the corolla was approaching the form of that assumed in complete peloria.

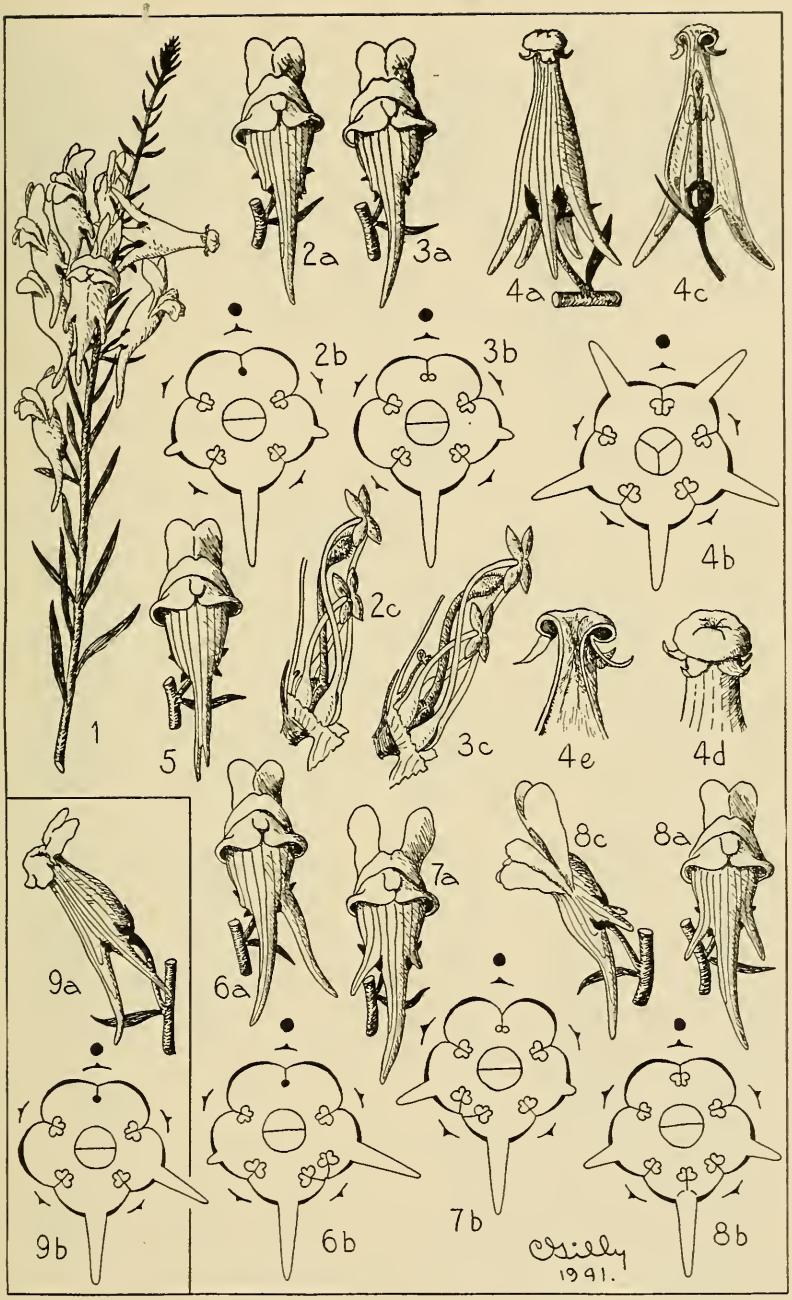
1
2a
3a
4a
4c
2b
3b
4b
5
2c
3c
4e
4d
9a
6a
7a
8c
8a
9b
6b
7b
8b
Osilly
1941.

Plate 1

From what we now know about the cytology of such organisms, it is reasonable to assume that, like so many similar cases, autopolyploidy[7] could easily bring about a population of completely

[7] *Autopolyploidy*—the doubling of the number of chromosomes of a form without prior hybridization; as contrasted with *allopolyploidy*—the doubling of the number of chromosomes of an individual the product of hybridization. In either case the resulting forms generally produce sufficient seed to maintain themselves under favorable environmental conditions.

Plate II

FIGURES 10a–16c. LINARIA VULGARIS HILL

Figures 10a–c, and 11. Normal flowers collected in Bronx Park, New York City, summer of 1940, by C. Gilly.

10a–b. External view and floral diagram of a flower with four stamens but with no evidence of the "fifth"; 10c, median section showing the relations of the internal parts to the spur and particularly the refolded nature of the labium on the lower lip of the corolla; 11, diagram of an otherwise normally appearing flower bearing two anther sacs on the "fifth" stamen much as in Figure 3c.

Figures 12a–14e. From a series of plants collected by R. Hitchcock, near Van Cortlandt Park, New York City, June, 1909.

12a–b. External views showing a rare condition in this collection, with five sepals and a small saccate enlargement in place of the spur; 12c, the corolla laid open showing the four normal stamens and minute supernumerary stamen structures on the lower lip; 12d, further enlargement of the apex of the lower lip of the corolla showing the supernumerary stamen-like structures near its margin.

13a–b. External views showing the more common condition with four sepals and no evidence of a spur; 13c, the corolla laid open showing the four normal stamens, several well developed stamen structures, and various sessile anther pouches.

14a–b. External views of a flower essentially similar to the preceding; 14c, its corolla laid open to show the position of the supernumerary anther and anther pouches near the margin of its lower lip; 14d–e, further enlargements of the lateral portions of the lower lip showing details of the supernumerary anther and several anther pouches.

Figures 15a–c. From a collection by John McCallum, Morris Park, Long Island, New York, in 1912.

15a–b. Two views of the same flower; 15c, its floral diagram.

Figures 16a–c. From a collection by Wm. Scott, York Mills, near Toronto, Canada, September 18, 1911.

16a–b. External views of a flower; 16c, its floral diagram showing four sepals, four corolla segments, two stamens and the bi-carpelled ovary.

FIGURES 17a–b. VERONICASTRUM VIRGINICUM (L.) FARWELL

From typical material deposited in the Herb. N. Y. Botanical Garden. 17a, external view; 17b, floral diagram.

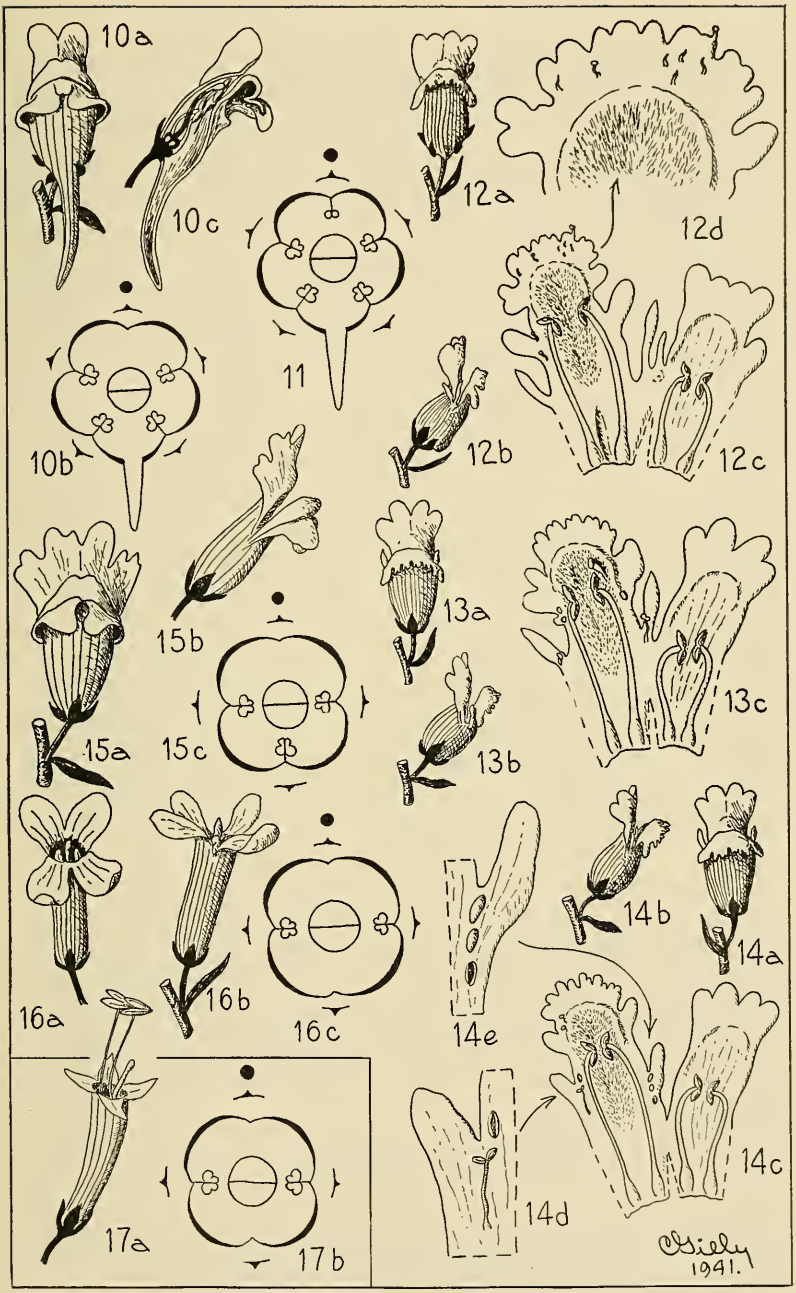
10a
10c
11
12a
12d
10b
12b
12c
15b
13a
13c
15a
15c
13b
16a
16b
16c
14e
14b
14a
14c
14d
17a
17b
1941.

Plate 2

fertile plants propagating and spreading themselves by means of seed. And thus would arise a race of plants with a stable heredity—and in this instance a race so different from the ancestral *Linaria* that any taxonomist seeing it for the first time would place it in the Scrophulariaceae, but would be *completely justified in describing the group as a new genus.*

While on this topic of the possible origin of taxonomic units above those of species, one cannot help but point out the structural similarity of the flowers of this unusual form of *Linaria* (as shown by Figures 16a–c) and that of the common Culver's root, *Veronicastrum virginicum* (Figures 17a–b). Although members of the same family, it is not implied that these two plants are of immediately mutual derivation. It is suggested only that the reduced condition of the nearly regular flowers of *Veronicastrum* (occurring as it does in a family with so much zygomorphy) may have been derived in a manner somewhat similar to the reduced and nearly regular forms of *Linaria vulgaris* with, of course, the advent of fertility due, possibly, to polyploidy of one sort or another. The possibility that *Veronicastrum* may be an anomalous genus the result of convergent evolution and is placed in the Veroniceae solely on the basis of its flower structure—with but little regard for the whorled condition of its leaves—must not be excluded from any ultimate discussion of the phylogeny of the group. It is our opinion that *Veronicastrum* is not necessarily a primitive member of this tribe as Pennell[8] has suggested.

For some years the study of "abnormal" flowers has been frowned upon by the systematist, but it is our opinion that if these forms are examined more closely in the future they will shed considerable light on the mechanics of the origin of the larger taxonomic units, such as genera and even families. This will be true particularly if these abnormalities are looked upon not merely as vegetable curiosities, but are studied both from the anatomical and cytological standpoint.

The New York Botanical Garden,
New York, N. Y.

[8] Pennell, F. W., "Veronica" in North and South America. Rhodora 23: 1-41. 1921. The Scrophulariaceae of eastern temperate North America Phil. Acad. Nat. Sci. Monog. No. 1. 1935.

Some Local Names of Plants—VII*

W. L. McAtee

At intervals, which I regret to note have been steadily increasing in length, I have made six contributions in Torreya toward a glossary of American plant names. Taste, and the opportunity afforded by search for vernacular appellations of birds, have played a part in the writer's dealing with plant cognomens but beyond those factors has been a hope that the recording of source material might be useful to those who are called upon to select standard terms for plants. It is my conviction that such selections should be based, so far as possible, on usage and it has been my aim to contribute toward a record of usage.

The present collection, like all the others in the series, contains names gleaned in the field by the writer and by friends and correspondents. In addition, there are appellations found in the course of reading articles and books, both old and new. This installment may be considered as including all noteworthy plant names from the periodical Dialect Notes from Volume 1, 1890 to date, and from the works recorded in the accompanying list of literature cited. To reduce the number of cognomens listed, all included with the same application in Lyons' "Plant Names, Scientific and Popular," 1907, and in the "Illustrated Flora of the Northern States and Canada," by Britton and Brown, 1936 (and, of course, in previous numbers of this series), have been omitted.

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As a contribution toward a bibliography of publications dealing significantly with plant names, the following titles may be cited in addition to those given in previous installments.

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Glossary

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Equisetaceae. 2. *Equisetum fluviatile* L.—Stovepipe reed, Mafeking, Manitoba, L. Butler (Canadian Field-Naturalist, 54, 1940, p. 37).

3. *Equisetum* spp.—Goose grass, Alaska, L. J. Goldman.

Pinaceae. 4. *Pinus cembroides* Zuccarini.—Mexican nut pine, Arizona, E. D. Ball (Journ. Ec. Ent. 29, 1936, p. 680).

5. *Pinus pungens* Lambert.—Squirrel pine, Huntington, Pa. Its cones are eagerly sought by squirrels. Wm. Mollenhauer, Jr. (Journ. Forestry, 37(5), May, 1939, p. 421).

6. *Pinus taeda* L.—White pine, Virginia (Clapin, 1907, p. 261).

7. *Picea canadensis* Miller.—Epinette blanche, French Canada (Clapin, 1907, p. 174); subekoondark, Indian name, Maine (Thoreau, Maine Woods, 1883, p. 325).

8. *Picea mariana Miller*.—Epinette noire, French Canada (Clapin, 1907, p. 174); skusk, Indian name, Maine (Thoreau, Maine Woods, 1883, p. 325).

9. *Juniperus communis* L.—Crow-berry, Hudson's Bay, John Richardson, (Fauna Boreali-Americana, 2, 1831, p. 248).

Gnetaceae. 10. *Ephedra* spp.—Canutillo (Bentley, 1932, pp. 115–116).

Typhaceae. 11. *Typha latifolia* L.—Flat grass, Santee Club, S. C.

Zannichelliaceae. 12. *Potamogeton pectinatus* L.—Bay grass, Norfolk, Va., E. L. Mayer; buff grass, Reelfoot Lake, Tenn., C. Cottam; nut grass, Suisun Marshes, Calif., J. Moffitt (Condor, 40, 1938, p. 78). In this series and elsewhere, the writer has recorded 18 different terms for this plant, most of them in genuine vernacular use. Yet we find in botanies the invented bookish appellation, fennel-leaved pondweed.

Vallisneriaceae. 13. *Vallisneria spiralis* L.—Canvasback grass, duck grass (Doughty, Cabinet 1830–31, I, p. 182, I, pp. 41); channel-weed C. S. Rafinesque (Medical Repository, 2(2), 1804, p. 208); river-weed, Silver Springs, Fla.

Gramineae. 14. *Andropogon barbinodis* Lagasca.—Broom-rape, Arizona, E. D. Ball (Journ. Ec. Ent. 29, 1936, p. 680). Is this merely a modification through bad penmanship of broom-sage (*i.e.*, sedge)?

15. *Andropogon furcatus* Muhlenberg.—Purple-fingered grass (Thoreau, Excursions, 1883, p. 223).

16. *Andropogon scoparius* Michaux.—Purple wood grass (Thoreau, Excursions, 1883, p. 223).

17. *Hilaria mutica* Buckley.—Buffalo grass, Amarillo, Tex., Philip F. Allan.

18. *Hilaria rigida* Thurber.—Galleta (Bentley, 1932, p. 138).

19. *Chaetochloa magna* Grisebach.—Cat-tail, Santee Club, S. C.

20. *Zizania aquatica* L.—Riz du Canada (Clapin, 1907, p. 192).

21. *Muhlenbergia porteri* Scribner.—Bush grama, hoe grass, tangle grass, white grama, Tucson, Ariz., Gale Monson. The writer trusts that this exhibit will be an inspiration to those who seem unable to find any names for the Muhlenbergia grasses except those containing the term Muhly, a slangy abbreviation, and as inevitably pronounced, anything but a tribute to a respected early American botanist.

22. *Stipa comata* Trinius and Ruprecht.—Spear grass, Pitrodie, S. Dak., E. S. Cheney (Oologist, 7, 1890, p. 201).

23. *Phragmites phragmites* L.—Carrizo (Bentley, 1932, p. 117).

24. *Buchloë dactyloides* Nuttall.—Curly mesquite, mesquite grass, vine mesquite, Texas Panhandle, Philip F. Allan.

25. *Eragrostis pectinacea* Michaux.—Purple grass (Thoreau, Excursions, 1883, p. 219.

26. *Agropyron repens* L.—Piper grass, Concord, Mass. (Thoreau, Notes on New England Birds, F. H. Allen, Editor, 1910, p. 280).

CYPERACEAE. 27. *Cyperus esculentus* L.—Sweet coco, Catahoula, La., C. Cottam.

28. *Cyperus rotundus* L.—Bitter coco, Catahoula, La., C. Cottam.

29. *Scirpus americanus* Persoon.—Goose grass, Mississippi Delta, La., C. C. Sperry.

30. *Scirpus olneyi* A. Gray.—Goose grass, Mississippi Delta, La., C. C. Sperry.

31. *Scirpus robustus* Pursh.—Angle grass, Oakley, S. C., Nathaniel Heyward.

32. *Eleocharis acicularis* L. (and allies).—Frog's hair, Massachusetts (Dialect Notes 1(8), 1895, p. 388); New England (Clapin, 1907, p. 197).

COMMELINACEAE. 33. *Tradescantia* sp. (*"concolor"*).—Moses-in-the-bulrushes, St. Petersburg, Fla., F. S. Allen (Dialect Notes, 4(3), 1915, p. 302).

PONTEDERIACEAE. 34. *Pontederia cordata* L.—Moose-ear, Maine, Fannie H. Eckstrom (The Bird Book, 1901, p. 4).

LILIACEAE. 35. *Chlorogalum pomeridianum* Ker.—Palmilla (Clapin, 1907, p. 299); soap-lily, California, B. H. Lehman (Dialect Notes, 5(4), 1921, p. 114).

36. *Lilium canadense* L.—Sheepmoc, Indian name, Maine (Thoreau, Maine Woods, 1883, p. 326).

37. *Quamasia esculenta* Ker.—Camus plant, kamas root, quamish (Clapin, 1907, p. 325).

38. *Yucca treculeana* Carriere.—Spanish dagger, Austin P. Smith (Auk, 29(2), April, 1912, p. 244).

SMILACACEAE. 39. *Smilax rotundifolia* L.—Common greenbrier, Indian brier (Torrey, The Foot-path Way, 1896, p. 80).

AMARYLLIDACEAE. 40. *Narcissus pseudo-narcissus* L.—Easter flower, Garrett County, Md., F. Warnick.

41. *Agave americana* L.—Maguey, Texas (Tallichet, 1892, p. 191).

JUGLANDACEAE. 42. *Hicoria pecan* Marsh.—Nogal, Texas (Tallichet, 1892, p. 192).

BETULACEAE. 43. *Ostrya virginiana* Miller.—Bois de fer, French Canada (Clapin, 1907, p. 65).

FAGACEAE. 44. *Quercus ilicifolia* Wangenheim.—Shrub oak (Thoreau, Cape Cod, 1881, p. 93).

ULMACEAE. 45. *Celtis occidentalis* L.—Pompion-berry, spice-berry (Clapin, 1907, pp. 219, 378).

MORACEAE. 46. *Toxylon pomiferum* Rafinesque. — Bois d'arc—this well-known term is corrupted to bodark in the Ozark region, Vance Randolph (American Speech, 8(1), 1933, p. 48), and to bodok in the Texas Panhandle, Philip F. Allan; both of these derivatives are cited also in De Vere's Americanisms (1872, p. 110); bois jaune, mock orange, Louisiana (Brackenridge, Views of Louisiana, 1814, p. 59); the term mock orange is used also in Illinois, Iowa, Kansas, North Carolina, and Virginia (Dialect Notes, 4(6), 1917, p. 382).

OLACACEAE. 47. *Ximenia americana* L.—Pig plum (Clapin, 1907, p. 229).

POLYGONACEAE. 48. *Chorizanthe rigida* Torrey and Gray.—Horned-toad buckwheat, Arizona, E. D. Ball (Journ. Ec. Ent. 29, 1936, p. 682).

49. *Antigonon leptopus* Hooker and Arnott.—Rosa de montana, Mexico, Austin P. Smith (Auk, 29(2), April, 1912, p. 244).

CHENOPODIACEAE. 50. *Atriplex canescens* Pursh.—Chamise, Texas Panhandle, Philip F. Allan.

51. *Atriplex polycarpa* Watson.—Desert saltbush, Arizona, E. D. Ball (Journ. Ec. Ent. 29, 1936, p. 681).

52. *Salicornia* spp.—Sausage grass, South Carolina, C. Cottam.

53. *Sarcobatus vermiculatus* Hooker.—Chico (Bentley, 1932, p. 121).
54. *Dondia moquini* Torrey.—Burro-weed (Bentley, 1932, p. 107).

ALSINACEAE. 55. *Arenaria groenlandica* Retz.—Greenland sandwort, mountain daisy (Torrey, Birds in the Bush, 1885, p. 99; The Foot-path Way, 1896, p. 31).

CABOMBACEAE. 56. *Cabomba caroliniana* A. Gray.—Spring moss, Reelfoot Lake, Tenn., C. Cottam.

NELUMBONACEAE. 57. *Nelumbo lutea* Willdenow.—Alligator peas, knock-knocks, Oakley, S. C., Nathaniel Heyward.

NYMPHAEACEAE. 58. *Nymphaea advena* Solander. — Muleshoe, Reelfoot Lake, Tenn., C. Cottam.

MAGNOLIACEAE. 59. *Magnolia virginiana* L.—Beaver-wood, castor-wood (Clapin, 1907, p. 45); castor-tree (De Vere, 1872, p. 208).

RANUNCULACEAE. 60. *Coptis trifolia* L.—Savouillane, savoyane, French Canada (Clapin, 1907, p. 348).

61. *Hepatica hepatica* L.—May-flower, Roxbury, N. Y., Mrs. F. E. Shapleigh (Dialect Notes, 4(1), 1913, p. 54).

BERBERIDACEAE. 62. *Podophyllum peltatum* L.—Mug-apple (Wm. Smellie in Buffon, Nat. Hist. Birds, London, 1793, 2, p. 494). Independent evidence of this name is needed; mug-apple is possibly only may-apple transformed by bad handwriting. Smellie possibly copied it from Pennant (see this series III, 50).

63. *Achlys triphylla* DC.—Angel-leaves, elkhorn, smell-leaves, Washington State, R. M. Garrett (Dialect Notes, 5(1), 1918, p. 59; 5(3), 1920, p. 81).

CALYCANTHACEAE. 64. *Calycanthus floridus* L.—Pimento (De Vere, 1872, p. 413); sweet bush (Torrey, Spring Notes from Tennessee, 1896, p. 137).

CRUCIFERAE. 65. *Koniga maritima* L.—Sea kale, common in gardens, Princeton, N. J., Jacob Green (Doughty, Cabinet, 2, 1832-33, p. 53).

66. *Thlaspi arvense* L.—Fan-weed, Ovando, Mont., C. C. Sperry.

ROSACEAE. 67. *Rubus canadensis* L.—Bear-berry, October berry, North Carolina, A. Commons (as *R. millspaughi*).

68. *Rubus discolor* Weihe and Nees.—Blackberry rose, Fredericktown, Md., A. Commons. Probably a garden escape.

69. *Sibbaldiopsis tridentata* Solander.—Mountain cinquefoil (Thoreau, Maine Woods, 1883, p. 181).

70. *Cowania stansburiana* Jepson.—Alonsenel, a Mexican name used in the West (De Vere, 1872, p. 410; Clapin, 1907, p. 16).

MALACEAE. 71. *Sorbus americana* Marsh.—Upahsis, Indian name, Maine (Thoreau, Maine Woods, 1883, pp. 99, 324).

72. *Amelanchier canadensis* L.—Joshpear (Thoreau, Cape Cod, 1881, p. 188).

73. *Amelanchier bartramiana* Tausch.—Few-flowered shadbush (Torrey, Footing it in Franconia, 1902, p. 91).

AMYGDALACEAE. 74. *Osmaronia cerasiformis* Torrey and Gray.—Indian plum, squaw berry, Washington State, R. M. Garrett (Dialect Notes, 5(2), 1920, pp. 82, 84).

75. *Laurocerasus caroliniana* Miller.—Mock orange (Clapin, 1907, p. 277).

76. *Prunus cuneata* Rafinesque.—Dwarf cherry (Thoreau, Maine Woods, 1883, p. 313).

MIMOSACEAE. 77. *Pithecolobium brevifolium* Bentham.—Huajillo, Texas (Tallichet, 1892, p. 190).

CAESALPINACEAE. 78. *Krameria canescens* A. Gray.—Chacate, Texas (Tallichet, 1892, p. 189).

79. *Gleditsia triacanthos* L.—Honeypod, Virginia (Green, 1912, p. 504); thorny locust (De Vere, 1872, p. 417; Clapin, 1907, p. 231).

80. *Gymnocladus dioica* L.—Kentucky locust (De Vere, 1872, p. 416).

81. *Hoffmanseggia stricta* Bentham.—Camote del raton, Texas (Tallichet, 1892, p. 189).

FABACEAE. 82. *Sophora secundiflora* Cavanilles.—Frijolillo, Texas (Tallichet, 1892, p. 190).

83. *Crotalaria sagittalis* L.—Rattle-weed (Dialect Notes, 6(3), 1931, p. 204).

84. *Cytisus scoparius* L.—Scotch bloom, very common error, Washington State, R. M. Garrett (Dialect Notes, 5(1), 1918, p. 58).

85. *Psoralea esculenta* Pursh.—Bread-root, Indian turnip (De Vere, 1872, pp. 399, 109).

86. *Peteria scoparia* A. Gray.—Camote del monte, Texas (Tallichet, 1892, pp. 188-189).

87. *Sesban macrocarpa* Muhlenberg.—Coffee-weed, Morton, Miss., E. G. Holt.

88. *Astragalus mollissimus* Torrey.—Garabanzillo (Fifth Bien. Rep. Kansas State Bd. Agr. 1885-86, p. 209).

ZYGOPHYLLACEAE. 89. *Porlieria angustifolia* Engelmann.—Guayacan, Texas (Tallichet, 1892, p. 190).

RUTACEAE. 90. *Xanthoxylum fagara* L.—Colima, Texas (Tallichet, 1892, p. 189).

SIMAROUBACEAE. 91. *Castela nicholsoni* Hooker.—Goat-bush, Texas (Clapin, 1907, p. 17).

EUPHORBIACEAE. 92. *Euphorbia polycarpa* Bentham.—Golondrina, rattlesnake-weed (Bentley, 1932, p. 139).

EMPETRACEAE. 93. *Empetrum nigrum* L.—Black-berry, Labrador (Townsend, C. W., and Allan, G. M., Proc. Boston Soc. Nat. Hist., 33, 1907, p. 357).

ANACARDIACEAE. 94. *Toxicodendron vernix* L.—Dogwood, Hampstead, N. H., J. W. Carr (Dialect Notes, 3(3), 1907, p. 186).

95. *Toxicodendron radicans* L.—Ivory (corruption of ivy), D. S. Crumb (Dialect Notes, 2(5), 1903, p. 318).

ILACACEAE. 96. *Ilex cassine* L.—Christmas tree, Okefinokee Swamp, Ga.

CELASTRACEAE. 97. *Euonymus americanus* L.—Bubby-bush, western North Carolina, H. Kephart (Dialect Notes, 4(6), 1917, p. 409). Error for *Calycanthus?*

98. *Celastrus scandens* L.—Bois retors, Frank T. Dillingham (Amer. Nat., 41(486), June, 1907, pp. 391–393, where ten other names are listed.

99. *Pachystima canbyi* A. Gray.—Cliff-green, A. B. Massey (Castanea, 5(1), January, 1940, p. 8).

ACERACEAE. 100. *Acer pennsylvanicum* L.—Bois barré, French Canada (Clapin, 1907, p. 65).

RHAMNACEAE. 101. *Zizyphus lycioides* Gray.—Gray thorn, Arizona, E. D. Ball (Journ. Ec. Ent. 29, 1936, p. 682).

102. *Karwinskia humboldtiana* Zuccarini.—Coyotillo, Texas (Tallichet, 1892, p. 190).

VITACEAE. 103. *Vitis vulpina* L.—Chicken grape, river grape (Clapin, 1907, p. 109).

104. *Cissus incisa* Nuttall.—Yerba del buey, Texas (Tallichet, 1892, p. 195).

MALVACEAE. 105. *Malva rotundifolia* L.—Button-weed, Garret County, Md., F. Warnick.

106. *Callirhoë* spp.—Meadow-beauty, wild hollyhock, wine-cup, Amarillo, Texas, Philip F. Allan.

HYPERICACEAE. 107. *Hypericum fasciculatum* Lamarck.—Guinea cypress, Bassenger, Fla., E. G. Holt (Wilson Bul., 37(3), September, 1930, p. 166).

108. *Hypericum perforatum* L.—Klamath-weed, California (Torreya, 38(1), January-February, 1938, p. 22).

TAMARICACEAE. 109. *Tamarix* spp.—Salt-cedar, tamarack, Texas Panhandle, Philip F. Allan.

CISTACEAE. 110. *Hudsonia tomentosa* Nuttall.—Sandbind, M. Cutler (Life, Journals, and Corr., 1793 (1888), II, p. 279).

VIOLACEAE. 111. *Viola* spp.—Chicken-fights, Garrett County, Md., F. Warnick.

TURNERACEAE. 112. *Turnera diffusa* Willdenow var. *aphrodisiaca* Urban.—Yerba de vemulo, Texas (Tallichet, 1892, p. 195).

PASSIFLORACEAE. 113. *Passiflora incarnata* L.—Molly-pop, East Alabama, L. W. Payne, Jr. (Dialect Notes, 3(5), 1909, p. 350); Chapel Hill, N. C., J. M. Steadman, Jr. (*op. cit.*, 5(1), 1918, p. 19).

CACTACEAE. 114. *Echinocactus horizonthalonius* Lemaire.—Bisagre, Texas. (Tallichet, 1892, p. 188.)

115. *Lophophora williamsii* Lemaire.—The source of mescal buttons called by the natives in various localities payote, hikuli, and wokowi. In Texas the buttons are sometimes called dry whiskey (Century Dict.). Whiskey plant, whiskey-root (De Vere, 1872, p. 399).

116. *Opuntia* spp. (including *O. fulgida* Engelmann, *O. mamillata* Schott, *O. spinosior* Engelmann, and probably others).—Cholla; this Mexican name is used generally along the southwestern border of the United States but the fact is not on readily accessible record. Aided by their minutely barbed and promptly clinging spines, the joints of chollas become detached at the slightest contact of animal or man, earning for the plants the popular name of jumping cactus (D. A. and A. L. Spencer, ms.). The name jumping cholla also is used according to W. P. Taylor. It is of interest that similar qualities of an eastern cactus, *Opuntia pes-corvi* have also inspired the fancy that the joints jump, as implied by the name jo-jumper recorded in these notes (IV, 1926, p. 6) for Sapelo Island, Ga. A cholla in southern California is called "devil cactus" (F. W. Kelsey, Condor, 5, 1903, p. 133).

THYMELEACEAE. 117. *Dirca palustris* L.—Bois de plomb, French Canada (Clapin, 1907, p. 256); wickerby, eastern Maine, J. W. Carr and G. D. Chase (Dialect Notes), 3(3), 1907, p. 251).

LYTHRACEAE. 118. *Lagerstroemia indica* L.—Laggerstreamer, leggerstreamer, East Alabama, L. W. Payne, Jr. (Dialect Notes, 3(5), 1909, p. 343). These instances of folk etymology suffer by comparison with ladies-streamer reported by R. M. Harper years ago. Queen-of-shrubs, Bermuda, Catherine B. Dillon (Louisiana Conservation Review, 6(1), January, 1937, pp. 21–23, 25). This article records numerous names for the crepe myrtle.

RHIZOPHORACEAE. 119. *Rhizophora mangle* L.—Loss-bush (easy to get lost in), Weealockale, Fla., Robert Curzon (Ornithologist and Oologist 16(9), September, 1891, p. 139).

ONAGRACEAE. 120. *Anogra trichocalyx* Nuttall.—Yerba salada (Bentley, 1932, p. 216).

ARALIACEAE. 121. *Aralia spinosa* L.—Tear-coat (also corrupted to tar-coat) (De Vere, 1872, p. 414).

AMMIACEAE. 122. *Heracleum lanatum* Michaux.—Alexander, Labrador. Traces back to Cartwright, 1771. Mary S. Evans (American Speech, 6(1), 1930, p. 56). Cartwright merely applied the English name of a similar appearing European plant, *Petroselinum alexandrinum.*

CORNACEAE. 123. *Cornus canadensis* L.—Checkerberry, ivory leaf, ivy leaf, Hampstead, N. H., J. W. Carr (Dialect Notes, 3(3), 1907, p. 191).

124. *Cornus stolonifera* Michaux.—Maquoxigill, Indian name (Thoreau, Maine Woods, 1883, pp. 174, 325); osier rouge (*op. cit.*, p. 310).

MONOTROPACEAE. 125. *Chimaphila umbellata* L.—Prince's-pride, wintergreen (Clapin, 1907, p. 309).

126. *Monotropa uniflora* L.—Waxplant (Clapin, 1907, p. 239).

ERICACEAE. 127. *Azalea nudiflora* L.—Pinxter blossoms, Albany County, N. Y., F. B. Lee (Dialect Notes, 1(8), 1895, p. 383); Pinxter blumachies, New York, New Jersey (Clapin, 1907, p. 309).

128. *Rhododendron lapponicum* L.—Lapland azalea (Torrey, The Foot-path Way, 1896, p. 31).

129. *Epigaea repens* L.—Our beauties, folk etymology for arbutus, Tompkins County, N. Y. (Dialect Notes, 1(8), 1895, p. 398).

130. *Gaultheria procumbens* L.—Chick-berry (De Vere, 1872, p. 402); ginger-leaf, ginger-plum, Cape Cod, Mass., Geo. D. Chase (Dialect Notes, 2(5), 1903, p. 297).

131. *Arctostaphylos uva-ursi* L.—L'ahb (corruption of French l'herbe), Chinook; kahksin (brittle made), Blackfoot Indians; waupachalie chashasha (tea tobacco), Sioux; chult'sh, Seattle Indians. W. S. Phillips (The Chinook Book, 1913, p. 58); sand berry, northeastern Illinois, J. F. Ferry (Auk, 24(2), April, 1907, p. 123).

VACCINIACEAE. 132. *Vitis-idaea vitis-idaea* L.—Partridge berry, Labrador, Cartwright, 1771 (Mary S. Evans, American Speech, 6(1), 1930, p. 57).

133. *Polycodium* spp.—He-huckleberry, "the fruit of which is twice the size of the ordinary kind," Ozark region, Vance Randolph (Dialect Notes, 5(10), 1927, p. 474). "He" as an adjective is often used, as in this case to denote large size; its use in an identical term for *Cyrilla racemiflora,* on the other hand, refers to the barrenness of the plant as compared to the fruitfulness of the similar appearing berried heaths.

134. *Chiogenes hispidula* L.—Cowosnebagosor, Indian name (Thoreau, Maine Woods, 1883, pp. 211–325).

EBENACEAE. 135. *Diospyros texana* Scheele.—Chapote, sapote, zapote (Clapin, 1907, p. 105).

OLEACEAE. 136. *Chionanthus virginica* L.—Grancy-graybeard, grandaddy-graybeard, East Alabama, L. W. Payne, Jr. (Dialect Notes 3(4), 1908, p. 317).

CUSCUTACEAE. 137. *Cuscuta* spp.—Goldthread, Virginia (Green, 1912, p. 270).

HYDROPHYLLACEAE. 138. *Eriodictyon tomentosum* Bentham.—Yerba buena, yerba santa (Bentley, 1932, p. 216).

139. *Ehretia elliptica* De Candolle.—Anaqua, knackaway, Texas (Clapin, 1907, p. 18).

LABIATAE. 140. *Salvia ballotaeflora* Bentham.—Majorana, Texas (Tallichet, 1892, p. 249).

141. *Salvia columbariae* Bentham.—Chia (Bentley, 1932, p. 120).

142. *Lycopus virginicus* L.—Virginia hoarhound (De Vere, 1872, p. 404).

SOLANACEAE. 143. *Capsicum baccatum* L.—Chiltapin, Texas (Tallichet, 1892, p. 246).

144. *Solanum elaeagnifolium* Cavanilles.—Bull-nettle, Missouri, R. H. Thornton (Dialect Notes, 6(3), 1931, p. 158).

145. *Nicotiana glauca* Graham.—Coneton, Texas (Tallichet, 1892, p. 247).

146. *Nicotiana* spp.—Coyote tobacco (Bentley, 1932, p. 129).

SCROPHULARIACEAE. 147. *Linaria linaria* L.—Hogmouths, Palenville, N. Y. (Dialect Notes, 1(9), 1896, p. 418).

148. *Orthocarpus erianthus* Bentham.—Butter-and-eggs, scrambled-eggs, California, B. H. Lehman (Dialect Notes, 5(4), 1921, p. 114).

LENTIBULARIACEAE. 149. *Pinguicula pumila* Michaux.—Valentine's flower St. Augustine, Fla. If you put one under your pillow and think of some one you would like to see, you will be pretty likely to dream of him. (Torrey, A Florida Sketch-book, 1894, p. 28).

MARTYNIACEAE. 150. *Martynia fragrans* Lindley.—Toloache, Texas (Tallichet, 1892, p. 253).

ACANTHACEAE. 151. *Beloperone californica* Bentham.—Chuparosa (Bentley, 1932, p. 124).

RUBIACEAE. 152. *Houstonia coerulea* L.—Quakers (De Vere, 1872, p. 406).

153. *Mitchella repens* L.—Turkey-berry, East Alabama, L. W. Paine, Jr. (Dialect Notes, 3(5), 1909, p. 384).

CAPRIFOLIACEAE. 154. *Sambucus canadensis* L.—Black elder (Thoreau, Maine Woods, 1883, p. 310).

155. *Viburnum alnifolium* Marsh.—White Mountain dogwood (Torrey, Footing it in Franconia, 1902, p. 130).

156. *Viburnum lentago* L.—Cow-berry, New England (Clapin, 1907, p. 140); doodlegee, Rockland County, N. Y. (Dialect Notes, 2(5), 1903, p. 351).

157. *Viburnum opulus* L.—Ebemena, Indian name (Thoreau, Maine Woods, 1883, pp. 136, 324); pembina, pimbina, from the Cree Indian name meaning watery berries (Clapin, 1907, p. 303); tree cranberry (De Vere, 1872, p. 401).

158. *Viburnum pauciflorum* Pylaie.—Cow-berry, cerise, French Canada (De Vere, 1872, p. 402).

159. *Linnaea americana* Forbes—Moxon (Thoreau, Maine Woods, 1883, p. 95).

160. *Lonicera canadensis* Marsh.—Twin-berry (De Vere, 1872, p. 402).

161. *Lonicera oblongifolia*. Goldie.—Swamp twin-berry (De Vere, 1872, p. 402).

VALERIANACEAE. 162. *Valeriana edulis* Nuttall.—Kooyah, Oregon Indians (Clapin, 1907, p. 252).

CUCURBITACEAE. 163. *Apodanthera undulata* A. Gray.—Melon loco, Texas (Tallichet, 1892, p. 191).

164. *Cucurbita foetidissima* H. B. K.—Calabacilla, Texas (Tallichet, 1892, p. 188).

CAMPANULACEAE. 165. *Jasione montana* L.—Blueweed, Lakewood, N. J., Bayard Long (Rhodora, 21, p. 108, June, 1919).

LOBELIACEAE. 166. *Lobelia cardinalis* L.—Highbelia (De Vere, 1872, p. 616).

167. *Lobelia inflata* L.—Lowbelia (De Vere, 1872, p. 616).

AMBROSIACEAE. 168. *Iva* spp.—Mangrove, southwestern Louisiana, C. C. Sperry.

169. *Ambrosia psilostachya* De Candolle.—Perennial ragweed, Arizona, E. D. Ball (Journ. Ec. Ent. 29, 1936, p. 682).

170. *Franseria dumosa* A. Gray.—Burroweed (Bentley, 1932, p. 107).

COMPOSITAE. 171. *Eupatorium purpureum* L.—Knot-root, Washington, D. C., E. S. Burgess.

172. *Solidago caesia* L.—Sylvan goldenrod (Torrey, A Rambler's Lease, 1896, p. 16).

173. *Solidago bicolor* L.—Silvery-rod (Torrey, A Rambler's Lease, 1896, p. 16).

174. *Aster macrophyllus* L.—Petonane, Indian name in French Canada (Clapin, 1907, p. 305).

175. *Leptilon canadense* L.—Cocash, squaw-weed (Clapin, 1907, p. 125).

176. *Baccharis halimifolia* L.—Mangrove, southwestern Louisiana, C. C. Sperry.

177. *Baccharis wrightii* Gray.—Desert broom, Arizona, E. D. Ball (Journ. Ec. Ent. 29, 1936, p. 683).

178. *Zinnia elegans* Jacquin.—Ol(d)maid, East Alabama, L. W. Payne, Jr. (Dialect Notes, 3(5), 1909, p. 353).

179. *Brauneria angustifolia* De Candolle.—Snake-root, Kansas, C. C. Sperry.

180. *Bacria gracilis* De Candolle.—Fly-flower, sunshine-flower, scrambled-eggs, California, B. H. Lehman (Dialect Notes, 5(4), 1921, p. 114).

181. *Helianthus tuberosus* L.—Chiben, chibequi, Indian names, French Canada (Clapin, 1907, p. 108).

182. *Pectis papposa* Harvey and Gray.—Chinchweed (Bentley, 1932, p. 122).

183. *Hymenatherum micropoides* De Candolle.—Lepiana, Texas (Tallichet, 1892, p. 249).

184. *Chrysactinia mexicana* A Gray.—Damiana, Texas (Tallichet, 1892, p. 247).

185. *Chrysanthemum leucanthemum* L.—Dutch-cuss (*i.e.*, curse), New Jersey, M. A. Harris (Dialect Notes, 1(9), 1896, p. 416).

186. *Senecio millefolium* Torrey and Gray.—Yarrow-leaved ragwort (Torrey, Spring Notes from Tennessee, 1896, pp. 93, 122).

187. *Arctium minus* Schkuhr.—Nigger-lice, Baltimore, Md. So-called years ago when used by the boys to throw at colored girls, on the theory that if any of them got fairly into the hair, her head would have to be shaved. H. L. Mencken.

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Biological Survey,
Washington, D. C.

A Pink Form of Viburnum tomentosum

For many years we have had in the Brooklyn Botanic Garden an undescribed pink form of the Asiatic *Viburnum tomentosum*. It was probably one of a number of Chinese Viburnums obtained from the Arnold Arboretum. Some years ago we labeled this attractive shrub *Viburnum tomentosum roseum*.

Viburnum tomentosum Thunberg f. roseum, forma nova. A forma typica floribus roseis differt.

This form is mentioned in a list just published of about 1,000 species of shrubs growing outdoors in the Brooklyn Botanic Garden.

Charles F. Doney
Assistant in Woody Plants

Brooklyn Botanic Garden.

A Further Note on the Culture of Spirogyra

Paul F. Brandwein

Last year the writer (1) published some preliminary observations on the cultivation of a species of *Spirogyra,* which, however, remains unidentified due to its failure to produce zygospores. Essentially, the method involved introducing *Spirogyra* into a *Daphnia* culture in egg yolk-tap water medium. Although the method is crude the growth of the alga in this micro-pond, as it were, is remarkable.

Since then an inorganic solution has been developed to replace the tap water which may vary in different localities. Furthermore, preliminary work indicates that the *Daphnia* and egg yolk may also be dispensed with. This information is presented in the present paper with a view to aiding those who may be working with the alga.

The constituents of the inorganic solution were suggested by an analysis of New York City tap water; the concentration of the salts was increased, however, after due experimentation. Since previous work indicated that *Spirogyra* requires some organic material to stimulate growth, a search was made for a suitable substance. After countless failures it was found that Bacto-tryptophane powder (a Difco product) was the best. The results at present seem to show that the substances required are in the nature of proteins, perhaps simple amino acids. Arginine, which Czurda (2) used, and glycine do not appear to be as suitable as the Bacto-tryptophane digest. The growth of the alga is not as rapid, however, as in the *Daphnia* culture. The ingredients of the medium follow:

$NaCl$	0.008 gm.
$MgSO_4$	0.012 gm.
KNO_3	0.005 gm.
$FeCl_3$	0.0002 (trace)
$CaSO_4$	0.03 gm.
Bacto-tryptophane powder (Difco)	50.0–70.0 milligm.
Dist. H_2O	1000.0 cc.

The *Spirogyra* cultures are best maintained at temperatures between 20 and 22° C. in light of medium intensity. The writer will be glad to supply the alga upon receipt of a suitable container.

Literature Cited

1. Brandwein, P. F. 1940. Preliminary observations on the culture of Spirogyra. Amer. Journ. Bot. 27: 161–162.
2. Czurda, V. 1926. Die Reinkultur von Conjugaten. Arch. f. Prot. 53: 215–242, 6 figs.

Washington Square College,
New York University.

Dracocephalum thymiflorum in Ontario

N. C. Fassett

Dracocephalum thymiflorum L., a native of Siberia which entered Finland and Sweden at a very early date and has more recently spread as far as central Europe, was reported from this continent some thirty years ago as a casual plant in a wool-waste dump at Westford, Massachusetts.[1] On June 30, 1938, Dr. Edgar Anderson and the writer were collecting on Big Hill, the highest point on Manitoulin Island in Lake Huron, and Dr. Anderson found a mint which proves to be this species. It grew in some abundance along an old lumber road near the summit of the hill. There is in the herbarium of the Missouri Botanical Garden a single collection from the United States, from Henry Lake, Fremont County, Idaho, July 12, 1920, *Dr. E. B. Payson & Lois Payson,* no. 1996.

Like *D. parviflorum* this species has the ovate uppermost lobe of the calyx much wider than the other four triangular lobes (see fig. 892 in Gray's Manual). It differs from *D. parviflorum* in having its flowers in distant whorls forming slender interrupted spikes, and in its narrower less conspicuously toothed leaves.

[1] Fletcher, Rhodora 13: 212. 1911.

Department of Botany,
University of Wisconsin.

Northeastern Limits of the Known Range of Rhus toxicodendron

Robert T. Clausen

Barkley (1937) indicated the northeastern limits of the distribution of *Rhus toxicodendron,* poison ivy, in North America as Nova Scotia (Yarmouth County) and southern Quebec (Longueil); McNair (1925) as New Brunswick and Nova Scotia; and Britton and Brown (1913) as Nova Scotia. In Gray's Manual, there is no definite statement of range for the species. Barkley, the monographer of the group, cited only one collection from Quebec, and that from near Montreal. Marie-Victorin (1935) stated that the species is general and very common in almost all habitats in the middle portion of the St. Lawrence River basin, the area covered by his flora. This statement is supported by a series of specimens before me from various parts of this area: Ottawa, Aylmer, L'Isle de Montreal, Isle Perrot, Pointe-du-Lac, Grosse-Isle, Saint-Pie, Montmorency Falls, and Berthier-en-Bas. From the extreme eastern border of this area, in the Matapédia River Basin, there are specimens from Milnikek and from the junction of the Restigouche and Matapédia Rivers.

On the Gaspé Peninsula the species is apparently rare, but it occurs out to the eastern extremity. On September 7, 1937, H. Trapido and I, while botanizing along the eastern base of Mt. Ste. Anne, encountered a large patch of the plant. Later, Prof. S. C. Ball of Yale University sent me specimens (now in the herbarium of Cornell University) of twigs and leaves collected by him on September 6, 1939, from the top of a 400-foot talus slope below the highest cliffs at St. Alban, Cap-des-Rosiers. Knowledge of these occurrences led to investigation for further specimens from the Gaspé Peninsula. At the Gray Herbarium are two such collections: talus slopes, Cap-des-Rosiers, July 14, 1932, *A. S. Pease;* and Rivière Petit-Pabos, on the flats about five miles above the mouth, *F. M.-Victorin, F. Rolland-Germain,* and *E. Jacques, 44919.*

In Nova Scotia, poison ivy occurs eastward as far as Halifax, Guysborough and Victoria Counties. Port Bevis, in the last-named county, is the easternmost record known to me.

In the preparation of this note I express appreciation to Prof. S. C. Ball for the donation of his specimens from Cap-des-Rosiers, to the University of Montreal for the loan of twenty-eight specimens and to the National Herbarium of Canada for the loan of four specimens. Also, I am grateful to the authorities at the following institutions for the opportunity to study their collections: Academy of Natural Sciences of Philadelphia, Gray Herbarium of Harvard University, and the New York Botanical Garden.

Literature Cited

Barkley, F. A. 1937. A monographic study of *Rhus* and its immediate allies in North and Central America, including the West Indies. Ann. Mo. Bot. Gard. **24** (3) : 265–498. pl. 10–26.

McNair, James B. 1925. The taxonomy of poison ivy, Field Mus. Nat. Hist. Publ. 225. Bot. Ser. 4 (3) : 55–70. tab. 1–4, pl. 14–24.

Britton, N. L., and Brown, A. 1913. *Toxicodendron,* in Illustrated Flora. **2**: 483–484.

Victorin, Marie-. 1935. *Rhus Toxicodendron,* in Flore Laurentienne. pp. 392–393.

Bailey Hortorium,
Cornell University,
Ithaca, N. Y.

Useful Source Book. Every teacher and worker in science is confronted sooner or later with the problem of the use of this or that chemical substance. "Uses and Applications of Chemicals and Related Substances," by Gregory (Reinhold Publishing Company), is a book which answers these problems. The book deals largely with straight chemicals but all the important plant chemical substances are covered. Citric acid (commercially produced by means of fungi) has over twenty applications in industry. Agar (obtained from species of red algae) the common culture media base is a constituent of many food products and has ten other technical uses. Pectin, the substance that causes fruit juices to jell, has a dozen other applications in the arts. Even henna (the flower of Paradise) dyes feathers as well as human hair. Pine oil has nineteen different uses some of which seem quite unrelated when one considers it may be a perfume base or a metal cleaner.

BOOK REVIEWS

The New Systematics

The New Systematics, Edited by Julian Huxley. Pp. 583. Oxford. 1940. $6.00.

Since the first of the really important reorganizations of the Linnaean "Natural System" during the early part of the nineteenth century, there has been a rather fundamental argument among taxonomists as to the function and scope of their profession. Some have held—and it is today a common view—that the taxonomist should concern himself solely with the naming of specimens; that to be interested in the phylogeny of the organisms which they represent was a harmless pastime to be indulged in only as a sort of mental gymnastics. But even so, these same taxonomists always welcomed a somewhat more inclusive appellation, that of Systematist, thus admitting that they were making some conscious attempt to organize the world's biota according to its relationships. The various "systems" used by contemporary taxonomists attest the lively controversies yet in progress concerning this matter of phylogeny.

With the rapid development of the fields of genetics and cytology, particularly during the last three decades, it was hoped that these closely related sciences would do much toward disentangling the broader and more perplexing problems concerning the phylogeny of organisms. But as yet these hopes have not been realized. And this is nowhere more clearly emphasized than in this volume on "The New Systematics" for repeatedly, and even by the most optimistic of its various authors, it is shown that, so far, we have real data only on what can be termed micro-evolution.

The important thing, however, is not that we have not as yet solved the larger problems of phylogeny, but that we now have the means and techniques at hand for a study and analysis of the unit upon which the systematist must put his most careful attention: the species. In his Foreword, Huxley admits that "the new systematics is not yet in being: before it is born, the mass of new facts and ideas which the last two or three decades have hurled at us must be digested, correlated, and synthesized." After reading

this book, one cannot help but have the feeling that, so far as certain of its authors are concerned, there has been a deal of masticatory activity with but precious little digesting.

It is to be expected that a book written by twenty-two authors representing such a variety of scientific disciplines and viewpoints will be uneven or, for that matter, sometimes contradictory, or occasionally antagonistic to the general viewpoint and thesis of its central topic. But this should be no deterrent to the reader, particularly the student of organisms who, having to name them and, feeling that our present system of nomenclature is sometimes inadequate to express the complex relationships of the populations he finds in nature, wishes to take courage by reading of the similar problems which confront others working in the same or remote fields of biological endeavor. The problem of delimiting and naming specific and subspecific groups is the one thread of continuity which binds these heterogeneous chapters together, for they are by systematists working either in somewhat unorthodox manner or along the older classical lines, both in botany and zoology; they are written by geneticists, entomologists, plant breeders, ecologists, paleontologists, and cytologists; some of the authors, I am sure, would wish to be thought of merely as biologists; and, in this taxonomic potpourri, there is also a decent seasoning of that unclassifiable writer, the scientific philosopher.

Whether "The New Systematics" is a book pointing clearly the direction which taxonomy will ultimately take is not for the present reviewer to say—time will take care of that in a much more effective manner. If it does no more, it will at least serve warning on the more conservative of our contemporary systematists that the classical methods and concepts now so widely in use are shortly due for a very thorough reexamination. It is altogether likely that out of this inquiry may yet come a genetic methodology and approach to the science of taxonomy, one which inevitably will lead to a modification of the present system of nomenclature. For this reason, if for no other, "The New Systematics" is a book which should be read by all taxonomists.

W. H. Camp

New York Botanical Garden.

Two Good Books on Microtechnique

Elements of Botanical Microtechnique. John E. Sass, McGraw-Hill Publications in Botanical Sciences. 222 pages. 1940. $2.50.

One of the results of the present age of specialization which has penetrated the scientific world is the maintenance of a technician for the preparation of slides by most research organizations. Although this is a practical and efficient method in many types of investigation, in other kinds of research work it is advisable that some or all steps in the preparation be carried out by the investigator himself, since an intimate knowledge of the history, structure and orientation of the material is required. As Chamberlain, dean of American microscopists put it: "the student who has not had sufficient experience to make a first-class preparation for microscopic study cannot safely interpret slides made by others." With this situation in mind, the author compiled his book.

The manual was designed to meet the needs of beginners in research in the basic and applied plant sciences with an emphasis on gaining an understanding of the aim of the undertaking of every operation rather than on memorizing and mechanically following a written outline of procedure.

The book is divided into two parts—the first dealing with general principles and methods and the second part with specific methods. After a brief introduction in which the author notes the relative merits of the methods he is to discuss, a chapter is devoted to the collecting and subdividing of plant materials for processing. In a chapter on killing and fixing of plant tissues the author gives formulae for numerous fixatives and discusses the particular purpose for which each is adapted.

The two following chapters deal with dehydration, infiltration, and embedding in paraffin. The author is an exponent of the paper "boat" method of embedding and gives a detailed description of the infiltration process which should prove helpful to many. "Microtome Sectioning of Material" is the title of the next chapter which gives explicit instructions for cutting and mounting paraffin blocks and for the operation of the microtome. Here the author tries to account for the many pitfalls one encounters in sectioning, but who could explain many of the difficulties that the weary cytologist sometimes meets? The chapter on staining con-

tains many stain formulae, both the basic types and their newer derivatives. Eight staining charts are given, presenting the various steps with such clarity that they will be welcomed by both the beginner and veteran microtechnician.

The balance of Part I is concerned with the "much-maligned celloidin method," sectioning of unembedded tissues (which includes microchemical tests for those interested in chemical analysis of their sections), the preparation of whole mounts, and a chapter on the criteria of successful processing.

Part II is closely linked with Part I but applies the general rules with variations to the specific plants and plant parts and assignments requiring greater skill. A chapter on vegetative organs of vascular plants deals with meristem, stem, root and leaf technique. In a paragraph on root tips, the author states that the peak of mitotic activity for the onion is from 1:00–2:00 p.m. and from 11:00 p.m.–midnight, although many cytologists dispute this periodicity theory.

A chapter each is devoted to Thallophyta and Bryophyta followed by two chapters on the microtechnique of reproductive structures of Pteridophyta and Spermatophyta. The last two chapters of the book deal with the use of the microscope and photomicrography, a timely topic which should appeal to many readers.

The book is clearly and concisely written, and fully explicit without wordiness making it a credit to both author and publisher. There is an abundance of excellent diagrams and photographs, indispensable assets to a book on microtechnique.

Dorothy Longacre

Fordham University.

Plant Microtechnique. Donald A. Johansen. Pp. 523. McGraw-Hill Book Co. 1940. $4.50.

In "Plant Microtechnique," Donald Johansen has prepared an admirably organized and comprehensive text and manual on general and special methods in plant histology and cytology. The first part, 218 pages, deals in a general way with procedures, reagents, stains, etc. The remaining 300 pages take up in sequence "special methods for various phyla," in which the whole plant kingdom, from bacteria to flowering plants, is dealt with. That the book will prove an indispensable reference and class text for almost all botanists

may be predicted, both because of its specific reference values, and because of its admirable general point of view, and its lack of dogmatism with respect to the use of any particular method.

In the second section, dealing with the various groups of plants in sequence, the reviewer finds two points of special interest because of their significance from a general botanical point of view. The adoption of the word, "phylum," for a major plant group is perhaps a part of a growing tendency away from the separate terminology for botany and zoology, which has generally prevailed. Furthermore, the fact that fifteen such phyla are recognized is another interesting index of a possible trend toward a new subdivision of the plant kingdom. More and more it appears that botanists are becoming willing to depart from the long-standing grouping of plants into four or five complex, omnibus divisions. That different botanists, in breaking away from the older practices, show considerable divergence in their final tabulation of the phyla each recognizes, is perhaps a necessary result of a transition period. Such departures as the present should at least serve the purpose of focussing attention on the fact that a real problem exists.

Johansen recognizes fifteen phyletic groups arranged in the following order: Schizophyta, Chlorophyta, Euglenophyta, Pyrrophyta, Crysophyta, Phaeophyta, Cyanophyta, Rhodophyta, Myxothallophyta, Mycophyta (Eumycetes), Bryophyta, Pteridophyta, Cycadophyta, Coniferophyta, Anthophyta.

The very sequence, with its separation of groups usually kept together, as bacteria and blue-green algae, constitutes a challenge to critical consideration and revaluation of the evidence. In an arrangement which puts together all the fungi under one phylum, but recognizes four distinct vascular plant phyla, it is natural that the fungi require the largest number of pages of any one group.

R. C. Benedict

Brooklyn Botanic Garden,
and Brooklyn College.

PROCEEDINGS OF THE CLUB

Minutes of the Meeting of November 6, 1940

The meeting of the Torrey Botanical Club held at the American Museum of Natural History on November 6, 1940, was called to order by Dr. B. O. Dodge. At the request of the President, Dr. Edwin B. Matzke, Vice-president, presided at the meeting.

Thirty-eight members and friends were present.

The minutes of the meeting of October first were adopted as read.

Fifteen candidates were elected to annual membership: Brother Celestine, F.S.C., Manhattan College, New York, N. Y.; Dr. Leon C. Chesley, 292 Harrison St., Jersey City, N. J.; Mr. Leonard J. Duersmith, R.F.D. No. 1, Columbia, Pa.; Dr. Frederick W. Kilbourne, 190 Cook Ave., Meriden, Conn.; Dr. Mary Mazine Larisey, Judson College, Marion, Ala.; Prof. Fred A. Loew, 916 Himes St., Huntington, Ind.; Miss Dorothy J. Longacre, 11 Adams St., Sea Cliff, N. Y.; Dr. Ian McCallum, T. P. D. Co., Ltd., Palo Seco, Trinidad; Miss Ruth A. McLean, No. 2, Powe Apartment, 506 Buchanan Blvd., Durham, N. C.; Dr. J. Armstrong Miller, 152 Montgomery Ave., Cynwyd, Pa.; Dr. Walter Phillips, 109 E. Palisade Ave., Englewood, N. J.; Dr. J. A. Pinckard, Tobacco Research Laboratory, Agricultural Experiment Station, Chatham, Va.; Mrs. Elsie McElroy Slater, 516 Prospect Ave., El Paso, Tex.; Mr. G. M. Soxman, 718 Haines Ave., Dallas, Tex.; and Mr. R. Morgan Weed, New Canaan, Conn.

Two candidates were elected to associate membership: Miss Carolyn L. Allen, 69 N. Ninth St., Newark, N. J.; and Dr. Moses N. Levine, University Farm Campus, St. Paul, Minn.

The transfer of Miss Louella B. Conkling, Apart. 43, 126 Sterling Pl., Brooklyn, N. Y., from annual membership to associate membership was accepted.

At the request of Dr. J. S. Karling, Dr. Arthur H. Graves read the report of the Nominating Committee which had previously been approved by the Council.

The program of the evening consisted of a lecture by Dr. William J. Bonisteel on "Problems of the Aconites." The speaker's abstract follows:

Surveying the genus Aconitum from the viewpoint of the chemist one is confronted with over 300 presumed valid species of aconites spread throughout the northern hemisphere. One outstanding problem is the taxonomy of the genus. The genus was monographed, as a whole in 1826 by Reichenbach. It is hoped that the future monographer will be duly cognizant of the cytogenetical implications that exist in this group. From a center of distribution that would seem to be the Altai Mountains the plants are spread throughout the northern mountainous regions with a series of diploid, tetraploid, hexaploid, and octoploid plants. Many triploids are found either as accidental hybrids or as products of the plant hybridizer.

When the chemical constituents of the various polyploidy series are compared it has been found that the diploid aconites are for the most part non-toxic. The diploid *Aconitum noveboracense* of the Beaverkill region is non-toxic. Triploid and tetraploid aconites contain various modifications of the aconitine molecule and are among the most powerful poisons known. Yet the Indian aconite, *A. palmatum,* a hexaploid, is non-toxic. The octoploids have not been studied chemically and their toxicity is unknown. The cytogenetical factors underlying the chemical constitution of the different aconites is not known.

The tuberous roots of the diploids are relatively small, while the triploid, tetraploid and octoploid tubers of the blue flowered aconites are from eight to ten times the size of the diploid types. The blooming period of the aconites follows in the order of their chromosome number. In the triploid, Sparks Aconite, it seems certain that the plant arose from diploid parents, or at least one parent was a diploid while the other may have been a tetraploid. This would indicate that increasing the chromosome number in this aconite has resulted in the production of chemical substances which have marked toxicity. Many of the triploid have been found to be sterile plants and thus may only be propagated as clones. This is a desirable quality as it may be used as a means of standardizing the type of plant that produces a particular product.

In two aconites studied it has been found that in addition to the normal chromosome complex found in the root tip, sectors have been found with the double number of this chromosome complex. One triploid aconite had a sector with the hexaploid chromosome complex, while a diploid species have shown sectors with the tetraploid number of chromosomes. Since these chromosome duplications occurred in nature it may point to the origin of the polyploid series that exists in the genus Aconitum. Experiments have been carried out which indicate that one may, through the use of colchicine, induce chromosome duplication in the aconites. These problems are now being carried out with the idea of developing toxic chemical substances from diploid plants which are non-toxic.

Respectfully submitted,

Clyde Chandler
Recording Secretary

Minutes of the Meeting of November 20, 1940

The meeting of the Torrey Botanical Club held at the New York Botanical Garden on November 20, 1940, was called to order by the President, Dr. B. O. Dodge, at 3:30 P. M.

Twenty-seven persons were present.

The minutes of the meeting of November 6 were adopted as read.

Mr. Milo Samuel Baker, Santa Rosa Junior College, Santa Rosa, Calif., and Mr. Victor L. Cory, Range Botanist, Texas Substation No. 14, Sonora, Tex., were elected to annual membership. Miss Helen McLaughlin, 66 Scheerer Ave., Newark, N. J., was elected to associate membership.

Three resignations from annual membership were reported to the Club: Miss Sidonia Berkelhamer, 160 W. 95th St., New York, N. Y.; Mrs. Donald Durant, 419 E. 57th St., New York, N. Y.; and Mr. W. Lincoln Highton, 1800 Sheperd St., N. E., Washington, D. C.

Dr. William J. Bonisteel proposed that Article XIII of the Constitution and By-Laws of the Torrey Botanical Club as revised in October, 1938, be amended as follows:

Change the first sentence to read as follows:

> Each Associate Member shall pay the sum of two dollars and fifty cents ($2.50) annually and shall receive Torreya, the notices of the field trips and other announcements of the Club.

Dr. Moldenke reported that Dr. Henry H. Rusby, who joined the Club November 11, 1879, and became an Honorary Life Member in May, 1930, died on November 18, 1940.

Dr. Robbins moved and Dr. Bold seconded that resolutions be drawn up by the Corresponding Secretary and sent to the family expressing the sorrow of the Club in the loss of its member Dr. Henry H. Rusby.

Dr. Karling suggested that it might be of some credit to the Club to participate in the A. A. A. S. meetings in Philadelphia. Dr. Small suggested that the Club should sponsor a field trip in southern New Jersey. It was moved and voted that the president write Dr. Small and instruct him as Chairman of the Field Committee to arrange such a program.

The scientific program of the afternoon consisted of a lecture by Dr. Rhoda W. Benham on "The Nutrient and Growth Require-

ments of Pityrosporum ovale, a Lipophylic Fungus." The speaker's abstract follows:

Pityrosporum ovale, the tiny yeast-like organism found associated with dandruff scales, was successfully cultured on a medium containing fats. The essential fat was found to be the unsaturated oleic acid. The addition of vitamin B_6 and B_1 to this medium further increased growth. Liver extract when added to the oleic acid medium gave very heavy growth. It was concluded that in addition to the essential fatty acid, vitamins B_1 and B_6 were important as factors influencing the growth of Pityrosporum ovale and that a third as yet unknown factor present in liver extract was necessary to obtain maximum growth.

Respectfully submitted,

CLYDE CHANDLER
Recording Secretary

MINUTES OF THE MEETING OF DECEMBER 3, 1940

The meeting of the Torrey Botanical Club held at the American Museum of Natural History on December 3, 1940, was called to order by the President, Dr. B. O. Dodge, at 8:15 P.M.

Forty-three members and friends were present.

The minutes of November 20 were adopted as read.

Miss Gertrude Obner, 55 Fabyan Pl., Newark, N. J.; Dr. L. F. Randolph, Department of Botany, College of Agriculture, Ithaca, N. Y.; and Miss Phyllis Stanley, 641 Ridge St., Newark, N. J., were elected to associate membership.

It was with regret that the following resignations from annual membership were reported: Miss Caroline S. Romer, 212 Oak Ridge Ave., Summit, N. J.; Dr. Robert E. Woodson, Jr., Missouri Botanical Garden, St. Louis, Mo.; Mr. George M. Lash, 189–30 37th Ave., Flushing, L. I., N. Y.; Mr. Edwin de T. Bechtel, 2 Wall St., New York, N. Y.; Mr. Donovan S. Correll, Botanical Museum, Harvard University, Cambridge, Mass.; Miss Antoinette Wilson, 89 N. Main St., Spring Valley, N. Y.; and Mrs. William L. Skelton, 524 High St., Bath, Me.

The lecture on "Some Tree Hybrids" was presented by Dr. Arthur H. Graves of the Brooklyn Botanic Garden.

The London Plane (*Platanus acerifolia*) is admirably adapted to city conditions. It endures the hot, dry summers to which New York City is often subjected, and remains in mid-summer green of foliage, healthy and vigorous throughout, in strong contrast to the much vaunted pin oaks and Norway maples, whose foliage is often frayed and unsightly. An apparently

serious disease of the London Plane has been reported from Philadelphia and elsewhere (see Plant Disease Reporter **24**: 205, 1940), but so far not in Manhattan, though it is said to have occurred on Staten Island. For this reason, or until this disease is better known or the danger from it is past, it is better to go slowly in the planting of London Planes in the Metropolitan area.

In London this tree is of great importance to city dwellers. Large trees, well over a century in age, are common, especially in the Parks and city squares, as in the Bloomsbury Section. Here, in the midst of the London haze, soot, and smoke, the tree flourishes.

The origin of the London Plane continues to be a mystery. Since it possesses characters which in some respects seem to be midway between those of the Oriental Plane (*Platanus orientalis*) and the American Sycamore or Buttonball (*P. occidentalis*), Prof. A. Henry has brought forward a convincing argument that it is a chance hybrid of these two species, that originated in the Oxford Botanic Garden before the year 1700. Among other reasons for this belief is the fact that these two species were growing together in the Oxford Garden before 1700; that it has never been found in a wild state, and that its seedlings show the great variation characteristic of seedlings of an F1 hybrid. The speaker told of an effort now being made by the Brooklyn Botanic Garden to test this theory of the hybrid origin of the tree by hand pollinating the Oriental Plane tree at the Garden with pollen from native Sycamores in Connecticut.

The progress of the chestnut hybridization at the plantation at Hamden, Conn., was also outlined. Crossing of disease resistant Japanese chestnut with American chestnut, begun in 1930, has developed a fine timber type of chestnut of remarkably rapid growth, but this tree is not entirely disease resistant, although more so than its American parent. On this account, three years ago, the Japanese-American trees were crossed again with the most disease-resistant Chinese trees on the plantation, and at present about 150 trees with this pedigree are now growing there. Another method has been to cross the Japanese-American again with very resistant Japanese. A third is to breed together the Japanese-American hybrids. The crossing of good Chinese and American stock is also well under way and is being carried on in directions similar to those outlined for the Japanese-American hybrids. There are many other leads which are being followed, but these seem to be the most important. A review of last year's work appears in the December number of the *Torrey Bulletin*.

Respectfully submitted,

Clyde Chandler
Recording Secretary

Minutes of the Meeting of December 18, 1940

The meeting of the Torrey Botanical Club held at the New York Botanical Garden on Wednesday, December 18, 1940, was called to order by Dr. B. O. Dodge, at 3:30 P.M.

Thirty-one persons were present.

The minutes of the meeting of December 3 were adopted as read.

Eleven candidates were elected to annual membership: Dr. Constantine John Alexopoulos, Department of Biology, Kent State University, Kent, Ohio; Dr. Walter R. Bedell, West Winding, Poughkeepsie, N. Y.; Rev. Charles A. Berger, S.J., Director, Biological Laboratory, Fordham University, Bronx, N. Y.; Dr. F. Cleonique, Maison Principal, Laprairie, Quebec, Canada; Dr. Douglas W. Dunlop, Science Building, Brooklyn College, Brooklyn, N. Y.; Mr. Carlos R. Garcia, Department of Biology, University of Puerto Rico, Rio Piedras, Puerto Rico; Miss Anne M. Hanson, 149 W. 82nd St., New York, N. Y.; Dr. S. S. Ivanoff, Texas Agricultural Experiment Station, Winter Haven, Tex.; Mrs. Frederick L. Keays, 240 Middle Neck Rd., Great Neck, L. I., N. Y.; Dr. Raphael Kurzrok, 4560 Delafield Ave., Fieldston, N. Y.; and Mr. Harris Braley Parks, Route 1, Box 368, San Antonio, Tex.

Two candidates were elected to associate membership: Miss Frances Hillman, 102–502 62nd Dr., Forest Hills, N. Y., and Dr. Myrtle Lothrop Massey, 319 Sterling Pl., Brooklyn, N. Y.

Three resignations from annual membership were reported: Dr. Earl H. Newcomer, Department of Botany, Michigan State College, East Lansing, Mich.; Mrs. Martha S. Wood, "Braewold," Mount Kisco, N. Y.; and Mr. Herbert S. Zim, 151 W. 66th St., New York, N. Y.

Two resignations from associate membership were reported: Mr. Milton Lessor, 816 Howard Ave., Brooklyn, N. Y., and Dr. James Mandel, 18 E. 199th St., Bronx, N. Y.

The annual banquet to be held at the Men's Faculty Club on Tuesday evening, January 7, 1941, was announced by Dr. Karling.

No further business was transacted.

The scientific program of the afternoon consisted of reports by Dr. J. S. Karling on "Gas-House Fungi" and Mr. Libero Ajello on "The Cytology of Cystolith Formation in *Ficus elastica*."

Respectfully submitted,

Clyde Chandler
Recording Secretary

Minutes of the Meeting on January 7, 1941

The annual meeting of the Torrey Botanical Club was held at the Men's Faculty Club of Columbia on Tuesday, January 7, 1941. Dinner was served at 6:30 P.M., after which the meeting was called to order by the President, Dr. B. O. Dodge.

Ninety-seven members and friends were present.

The minutes of the meeting of December 18, 1940, were approved as read.

The Recording Secretary was instructed to cast a unanimous ballot for the election of Mr. Robert B. Anthoney, 343 Myrtle St., Reedsburg, Wis.; Dr. Roberta (Mohling) Ma, New York Botanical Garden, Bronx Park, N. Y.; and Father Adam Zajdel, 52–29 84th St., Elmhurst, L. I., N. Y., to annual membership.

The transfers of Miss Alexandra Kalmykow, 460 W. 143rd St., New York, N. Y., from annual membership to associate membership, and Mr. Herbert Pollack, 3022 84th St., Jackson Heights, L. I., N. Y., from associate membership to annual membership were approved.

Dr. Elsie M. Kupfer, Wadleigh High School, 114th St., and 7th Ave., New York, N. Y., was elected to honorary life membership.

The following resignations were reported: Annual: Mr. Julian Francis Detmer, "Edgemont," 192 Benedict Ave., Tarrytown, N. Y.; Dr. Robert B. Gordon, State Teachers College, West Chester, Pa.; Mr. Frederick W. Lewis, Box 66, Myrtle Beach, S. C.; Dr. Henry H. M. Lyle, 1217 Park Ave., New York, N. Y.; Mr. Maurice Burke Walters, 14556 Superior Rd., Heights Branch, Cleveland, Ohio; and Dr. Paul A. Young, Tomato Disease Laboratory, Jacksonville, Texas. Associate: Mrs. Edith J. Hastings, 842 19th St., Santa Monica, Calif.; and Miss Ruth H. Kennedy, 76 Washington St., East Orange, N. J.

Reports of the officers of the Club were mimeographed and distributed to those present at the annual dinner. Since the Club is duly proud of its balanced budget, Dr. Gleason in the absence of the Treasurer briefly presented the Treasurer's report.

The Club accepted the 1941 budget as approved by the Council.

At the request of the President the letter from Mr. Hastings giving his annual report as Editor of Torreya which was read by Dr. Rickett will be filed in the archives.

The President read the following list of officers elected by the Club to serve during 1941:

President: J. S. Karling.
First Vice-President: E. B. Matzke.
Second Vice-President: H. K. Svenson.
Corresponding Secretary: H. C. Bold.
Recording Secretary: J. W. Thomson, Jr.
Treasurer: H. N. Moldenke.
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R. C. Benedict,
Helen M. Trelease.
Delegate to the Council of the New York Academy of Sciences: W. J. Robbins.
Representative on the Board of Managers of the New York Botanical Garden: H. A. Gleason.
Representatives on the Council of the American Association for the Advancement of Science: B. O. Dodge,
C. S. Gager.

After Dr. Dodge as retiring President thanked the members of the Council and officers of the Club for their cooperation during his term of office, Dr. Karling pledged his loyalty and support to the Club as the newly elected President.

The meeting adjourned at 9 P.M.

Respectfully submitted,
CLYDE CHANDLER
Recording Secretary

NEWS NOTES

Mr. W. L. Dix, 801 Crown St., Morrisville, Pa., requests that anyone having a collection of Pennsylvania Cladoniae or now collecting Pennsylvania Cladoniae send him a list of his collections for inclusion in the catalog he is now preparing for that state.

THE TORREY BOTANICAL CLUB

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Ferns and Fern Allies: R. C. Benedict, W. Herbert Dole, N. E. Pfeiffer
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Freshwater Algae: H. C. Bold
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OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 66, published in 1939, contained 668 pages of text and 27 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24-67 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

Volume 19, no. 1, 92 pages, 1937, price $1.50. Volume 19, no. 2, 178 pages, 1938, price $2.00.

(3) INDEX TO AMERICAN BOTANICAL LITERATURE

Reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

HAROLD N. MOLDENKE,
New York Botanical Garden,
Bronx Park,
New York, N. Y.

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EDITED FOR

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BY

WILLIAM J. BONISTEEL

John Torrey, 1796-1873

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TORREYA

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TORREYA

Vol. 41 May-June, 1941 No. 3

Rhode Island Ferns

Kenneth E. Wright and Dorothy L. Crandall

The most recent contribution to the literature on the ferns of Rhode Island that the authors were able to find was that of George Noble (3) published in 1920. This is a revision of the first fifty-eight pages of James L. Bennett (2) book, which appeared in 1888. The only other publication found containing any sizeable list of ferns was that of William Bailey (1) published in 1895. Since many changes have occurred in the nomenclature of these ferns, and several species and forms have subsequently been found in Rhode Island, it was felt that a recent list would be a worthwhile contribution to our knowledge of Rhode Island flora. Nomenclature conforms with that of C. A. Weatherby's (4) article in the *American Fern Journal*. Most of the ferns listed below were collected and filed in Rhode Island State College Herbarium by the authors. For additional specimens the authors are indebted to Dr. Walter H. Snell for access to the herbaria of Brown University and of Professor J. Franklin Collins, and to Mr. Albert Lownes for the use of his private herbarium.

Ferns of Rhode Island

Polypodiaceae

Polypodium virginianum L.	Common Polypody
Adiantum pedatum L.	Maiden-hair Fern
Pteridium latiusculum (Desv.) Hieron	Brake or Bracken
Pellea atropurpurea (L.) Link	Purple-stemmed Cliff-brake
Woodwardia virginica (L.) Sm.	Virginia Chain-fern
Woodwardia areolata (L.) Moore	Net-veined Chain-fern
Asplenium Trichomanes L.	Maiden-hair Spleenwort
Asplenium platyneuron (L.) Oakes	Ebony Spleenwort
Athyrium asplenioides (Michx.) Desv.	Lady-fern

Torreya for May-June (Vol. 41: 73-104) was issued June 19, 1941.

Athyrium angustum (Willd.) Presl.	Lady-fern
Athyrium angustum var. *elatius* (Link) Butters	
Athyrium angustum var. *rubellum* (Gilbert) Butters	
Athyrium angustum f. elegans (Gilbert) Butters	
Athyrium thelypteroides (Michx.) Desv.	Silvery Spleenwort
Camptosorus rhizophyllus (L.) Link	Walking-fern
Polystichum acrostichoides (Michx.) Schott	Christmas Fern
Dryopteris Thelypteris (L.) A. Gray	Marsh Shield-fern
Dryopteris simulata (Davenp.) Underw.	Massachusetts Shield-fern
Dryopteris noveboracensis (L.) A. Gray	New York Fern
Dryopteris marginalis (L.) A. Gray	Marginal Shield-fern
Dryopteris marginalis f. elegans (Robinson) F. W. Gray	
Dryopteris marginalis f. tripinnatifida Clute	
Dryopteris Boottii (Tuckerm.) Underw.	Boot's Shield-fern
Dryopteris cristata (L.) A. Gray	Crested Shield-fern
Dryopteris cristata var. *Clintoniana* (D. C. Eaton) Underw.	Clinton's Shield-fern
Dryopteris spinulosa (Muell.) Kuntze	Spinulose Shield-fern
Dryopteris spinulosa var. *intermedia* (Muhl.) Underw.	
Dryopteris hexaganoptera (Michx.) C. Chr.	Broad Beech-fern
Dryopteris Phegopteris (L.) C. Chr.	Long Beech-fern
Dryopteris Linnaeana C. Chr.	Oak-fern
Cystopteris bulbifera (L.) Bernh.	Bulblet Cystopteris
Cystopteris fragilis (L.) Bernh.	Brittle Fern
Woodsia ilvensis (L.) R. Br.	Rusty Woodsia
Woodsia obtusa (Spreng.) Torr.	Blunt-lobed Woodsia
Dennstaedtia punctilobula (Michx.) Moore	Hay-scented Fern
Onoclea sensibilis L.	Sensitive Fern
Onoclea sensibilis var. *obtusilobata* (Schkuhr.) Torr.	
Pteretis nodulosa (Michx.) Nieuwl.	Ostrich Fern

Schizaeaceae

Lygodium palmatum (Bernh.) Sw.	Climbing Fern

Osmundaceae

Osmunda regalis var. *spectabilis* (Willd.) A. Gray	Royal Fern
Osmunda Clatoniana L.	Interrupted Fern
Osmunda cinnamomea L.	Cinnamon Fern
Osmunda cinnamomea var. *incisa* (J. W. Huntington) Gilbert	

Ophioglossaceae

Ophioglossum vulgatum L.	Adder's-tongue
Botrychium simplex Hitchcock	Little Grape-fern
Botrychium simplex f. subcompositum (Lasch) Milde	
Botrychium simplex f. compositum (Lasch) Milde	
Botrychium lanceolatum var. *angustisegmentum* (Gmel.) Angstr.	Lance-leaved Grape-fern
Botrychium matricariaefolium A. Braun	Matricary Grape-fern
Botrychium dissectum Sprengel	Cut-leaved Grape-fern
Botrychium dissectum f. obliquum (Muhl.)	Fern
Botrychium dissectum f. elongatum (Gilbert and Haberer) Weatherby	
Botrychium dissectum f. oneidense (Gilbert) Clute	
Botrychium multifidum var. *intermedium* (D. C. Eaton) Farwell	Multifid Grape-fern
Botrychium virginianum (L.) Sw.	Virginia Grape-fern

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Poison Ivy. Perhaps more questions are asked about poison ivy and its allies than any other plant that causes skin eruptions. "Rhus Dermatitis" by James B. McNair (The University of Chicago Press) is an extensive treatise covering nearly 300 pages. The chapters dealing with the history, distribution, morphology and anatomy, resin canals, origin and occurrence of the poison contains a wealth of botanical information. The chemistry and pathology of the plant as it relates to medicine is well written.

Plants Occurring on Calcareous Rock Outcrops in North Carolina

Henry J. Oosting

The soil preferences and ranges of acid or basic tolerance of many plants are well known. Those species with extreme requirements are of special interest because their distribution is frequently limited and they often occur sparsely or only locally within their ranges. Calcicoles, or plants which grow in calcareous habitats, may be in the latter category, particularly when limestone is rare or absent.

Limestone outcrops and calcareous soils are infrequent and widely isolated in North Carolina and, where they occur, are limited in extent. It would thus seem of interest to know something of the species associated with these areas and especially to determine whether calcicolous species are uniformly present when the habitats are so small and widely isolated. The state has been included in the reported ranges of several calcicoles but, of those species which are thought to be definitely restricted to calcareous habitats, there are few specimens on record. These same species are far more abundant in Tennessee, often in counties contiguous with the North Carolina line, for limestone is common on the Tennessee side of the Great Smoky Mountains.

With the objective of determining the species associated with the limestone and of adding new taxonomic records for North Carolina, as many calcareous habitats were visited as possible. Considerable difficulty was experienced in locating the usually small and isolated stations. Soil maps, available for only scattered counties, indicated two stations. Otherwise outcrops were located by chance. Inquiries concerning the sites of old lime kilns proved most fruitful although they led to several unsuccessful searches as well. Old quarries are all too frequently well below ground level and are today filled with water with no limestone showing at the surface in the vicinity. All of the calcareous outcrops visited, as well as a few rumored localities not yet seen, are in or near the mountains. Visits to shell-marl deposits in different parts of the Coastal plain proved fruitless. Here the calcareous material is invariably buried under several feet of acid soil. A few shell-marl strata were found

exposed in under-cut river bluffs but these were subject to constant disturbance and supported no plants of interest. Other exposures were submerged in old quarries. No calcicolous flowering plants were found.

The list of vascular plants collected on the outcrops or on associated calcareous soil is an extensive one. However, it seems reasonable to eliminate from consideration those dominant species with a wide range in the state and also most of the species which appeared at only one station. Of the latter, only those have been retained which are thought to have affinities with alkaline habitats. In the tabulation of occurrences of species the stations are indicated by letter as follows:

A—Madison County, steep south-facing bluff along the French Broad River just west of Hot Springs. Vegetation scrubby and cover incomplete, for soil is thin and anchorage largely restricted to crevices in rock.

B—Madison County, low bluff along "Shut-In-Creek," a small tributary of the French Broad flowing from the south, four miles west of Hot Springs. Thin mantle of soil overlying calcareous rock. Mostly rich hardwood forest.

C—McDowell County, site of old lime kiln six miles north of Marion on the east side of road to Linville Falls. Open hardwoods. Soil only a thin mantle and numerous small outcrops of bare rock.

D—McDowell County, eleven miles north of Marion on west side of road to Linville Falls. Lime plant in operation. Pastured slope with numerous outcrops and open woods on calcareous soil.

E—Transylvania County, Toxaway River gorge, somewhat below site of defunct Lake Toxaway. Records from several outcrops, some in shady woods some not.

F—Swain County, Nantahala Gorge, east bluff of river near roadside spring, "Blowing Springs," north of Nantahala Station. Rich hardwoods on thin alkaline soil overlying shady marble.

G—Swain County, Nantahala Gorge, bluff on west side of river near site of active quarrying, just north of Nantahala Station. Much bare marble, some young hardwoods.

H—Stanly and Montgomery Counties—"Falls of the Yadkin River," falls now inundated by power dams built below Badin. Dr. J. K. Small collected *Asplenium resiliens* here prior to construction of the dams. Apparently the station and the limestone are now cov-

ered by impounded water. Proximity of limestone and the species found, reason for inclusion of this locality. Records are from both bluffs of the river.

I—Yadkin County, "Lime Rock," about five miles north of East Bend, north facing bluff along Yadkin River. Steep shaded bluff, calcareous rock outcropping and site of old lime kilns.

The repeated occurrences (Table 1) of several species bear no relation to the calcareous substratum. *Polystichum acrostichoides, Asplenium platyneuron* and *Viburnum acerifolium* are common throughout North Carolina and may be found in almost any forest whether pine or hardwood. Another larger group occurs regu-

TABLE 1. A list of the species collected at two or more of the nine stations where calcareous rock was located. Stations are indicated by letter and collections by ×

	STATIONS									
	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	
Asplenium resiliens[1]	×	×	×	×	×	..	×	..	×	**[2]
Pellaea atropurpurea	×	×	×	×	×	..	×	..	×	*
Adiantum pedatum	..	..	..	×	×	×	×	×	×	+
Asplenium platyneuron	×	×	..	×	..	..	..	×	×	..
Asplenium trichomanes	..	..	..	..	×	×	×	×	×	+
Camptosorus rhizophyllus	..	×	×	..	..	×	×	..	×	*
Sedum ternatum	..	×	..	×	..	×	×	..	×	..
Arisaema triphyllum	..	×	×	×	..	..	..	..	×	..
Cystopteris fragilis	..	..	..	..	×	×	×	..	×	..
Polypodium polypodioides	×	×	×	..	..	..	..	×	..	..
Polystichum acrostichoides	×	..	×	..	..	..	×	×	×	..
Aruncus vulgaris	..	..	×	..	..	..	×	..	×	..
Asarum canadense	..	..	..	..	..	×	×	..	×	..
Botrychium virginianum	..	..	..	×	..	..	×	..	×	+
Cheilanthes tomentosa	×	..	..	..	×	..	..	×	..	+
Cystopteris bulbifera	..	×	..	..	..	×	×	..	..	**—*
Dryopteris noveboracensis	..	..	×	..	×	..	..	..	×	..
Galium circaezans	..	×	..	×	..	..	×	..	..	..
Heuchera spp.	..	×	..	..	..	..	×	..	×	..
Hydrangea arborescens	×	..	..	..	..	..	×	..	×	..
Iris verna	..	×	×	..	..	..	..	..	×	..
Phacelia brevistyla	..	×	..	..	..	×	×	..	..	..
Smilacina racemosa	..	..	..	×	..	..	×	..	×	..

TABLE 1.—*Continued*

	STATIONS									
	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	
Aquilegia canadensis	..	..	×	..	..	..	..	..	×	+
Carex platyphylla	..	×	..	..	..	..	..	..	×	..
Caulophyllum thalictroides	..	..	..	..	..	..	×	..	×	..
Cheilanthes alabamensis	×	..	..	..	×	..	..	..	..	**
Cimicifuga racemosa	..	×	×	..	..	..	..	..	..	..
Dioscorea glauca	..	×	..	..	..	..	×	..	..	..
Hypericum punctatum	×	×	..	..	..	..	..	..	..	..
Magnolia Fraseri	..	..	..	..	..	×	×	..	..	..
Mitella diphylla	..	..	..	..	..	×	×	..	..	+
Philadelphus hirsutus	×	×	..	..	..	..	..	..	..	..
Ruellia parviflora	×	..	..	..	..	..	×	..	..	..
Scleria oligantha	..	×	..	..	..	..	..	×	..	..
Selaginella apoda	..	×	..	..	×	..	..	..	..	*—+
Viburnum acerifolium	×	..	..	..	..	..	..	..	×	..
Asplenium cryptolepis	..	..	..	×	..	..	..	..	..	**
Carex heterosperma	..	..	..	×	..	..	..	..	..	+
Carex plantaginea	..	..	..	..	..	×	..	..	..	**
Cheilanthes lanosa	..	..	..	..	..	..	..	×	..	*—+
Polygala Senega	×	..	..	..	..	..	..	..	..	*

[1] Nomenclature is essentially that of Gray's Manual, 7th edition. The exceptions may be found in Small's Manual of the Southeastern Flora or Blomquist's Ferns of North Carolina, 1934. Specimens of all collections are deposited in the Duke University Herbarium.

[2] Meaning of symbols in terms of manuals and other similar sources of information.

**— found only in calcacerous habitats (obligate calciphiles).

*— found characteristically in alkaline habitats but not restricted to them (calciphiles).

+— growing in soils of widely different pH but apparently best suited to calcareous substrata.

larly in any moist, rich hardwood forest especially in or near the mountains. This group includes practically all other species not marked with a symbol. *Arisaema, Aruncus, Hydrangea* and *Smilacina* are familiar illustrations. It should be noted that these species were found only on the forested portions of areas studied and that here the accumulated organic layer overlying the mineral soil is essentially acid. The significant species were found almost exclusively on exposed limestone or thin mineral soil with an alkaline reaction.

There remain seventeen species which are, according to the manuals, calcicolous in habit. These are the species of particular interest. The nine species marked (+), indicating best development on alkaline substrata, show no significant correlation with these special stations. *Cheilanthes lanosa* was found only once and then was not on calcareous rock. It occurs in several stations in western North Carolina, apparently quite remote from limestone. This is also probably true of *Carex heterosperma.* Of the species found at two stations, *Selaginella apoda* can be of no significance for it appears in moist, shaded situations throughout the state. *Aquilegia canadensis* likewise appears sporadically with no apparent calcareous connections. *Mitella diphylla* is less common and less widespread but would not be classed as primarily calcicolous in North Carolina. Although found at three calcareous localities *Botrychium virginianum* occurs in almost any damp hardwood forest and *Cheilanthes tomentosa,* though by no means common, may be expected on any kind of rocky bluff. The consistent occurrences of *Asplenium trichomanes* and *Adiantum pedatum* suggest a calcareous relationship for, although they may be found on shaded rocky bluffs in all parts of western North Carolina they would hardly be expected with such frequency.

The list includes four calciphiles (*). *Polygala Senega* was found at only one station but, since it is relatively rare in the state, this collection may be significant. The repeated appearances of *Camptosorus* and *Pellaea* indicate their adaptation to alkalinity for they are found only rarely elsewhere. *Cystopteris bulbifera* is definitely an obligate calciphile in North Carolina for it is only found on limestone. Nearer the center of its range, it may not always be so. This situation agrees with observations made by Pesola[3] in Finland where, he concluded, calcicolous species become more closely bound by specific habitat factors the nearer they approach the limits of their range, or if they are subjected to extremes in growing conditions.

Four species were found which are usually recognized as growing only in calcareous soils (obligate calciphiles**). Among these,

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[3] Pesola, V. A. 1928. Kalsiumkarbonaatti kasvimaantieteelisenä teki jänä Suomessa. Ann. Soc. Zoolog.-Bot. Fennicae Vanamo 9 (1) : 1–246. n.v. (See Wherry, Ecology 11 : 450–452, 1930).

Asplenium resiliens is most noteworthy because of its appearance at seven stations. With two exceptions these all seem to be new records for the state.[4] *Cheilanthes alabamensis,* too, was found only on limestone but apparently it is not as adaptable as *Asplenium resiliens* for it occurred at only two stations. Finally *Asplenium cryptolepis* and *Carex plantaginea* were found each at one station growing directly upon limestone.

Discussion and Summary

In a survey of the infrequent limestone outcrops of North Carolina, nine were located and studied botanically. All are in the mountains in the western part of the state and are within the general range of numerous species which are restricted to alkaline habitats. The collections (Table 1) made at these stations are of interest not only because they include several new records for the state but because of the isolated and restricted nature of the outcrops. In spite of the widely separated localities and the distance to the nearest abundant limestone, four obligate calciphiles were found. Of these, *Asplenium resiliens* appeared consistently while *Cheilanthes alabamensis* was found at only two stations and *Asplenium cryptolepis* and *Carex plantaginea* at one. In addition, the calciphile, *Cystopteris bulbifera,* was found at three stations, indicating its obligate nature under the extreme conditions. Several other species with less positive alkaline predilections were rather consistently present.

The survey indicates that certain calciphiles tend to be present wherever there is limestone, within or at the margins of their ranges, even though the stations may be widely separated as in North Carolina. Certain species not necessarily restricted to alkaline habitats tend to become so when near the extremities of their normal distribution. Of these species, apparently favored by a calcareous substratum where it is quite generally available, some seem, here in North Carolina, to be concentrated in alkaline habitats while others are apparently not affected in their numbers or distribution.

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[4] Blomquist, H. L., and Correll, D. S. 1940. A county check list of North Carolina ferns and fern allies. Jour. Elisha Mitchell Sci. Soc. 56: 53–105.

Liriodendron in the Miocene of America and Eastern Asia

Edward W. Berry

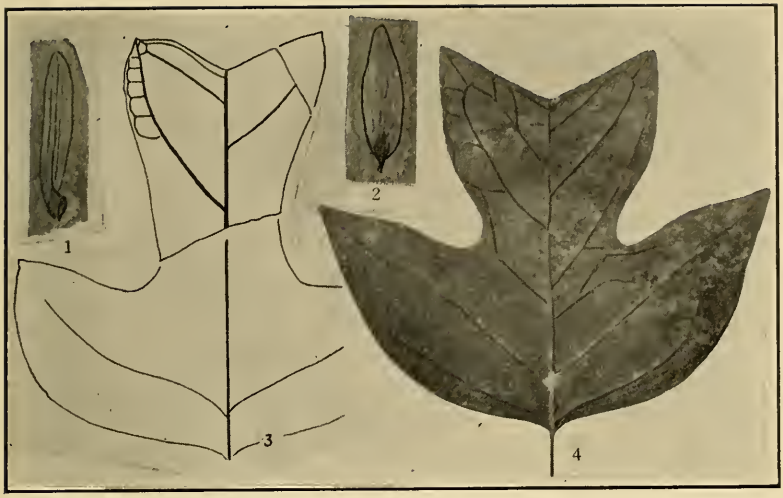
More or less complete accounts of the geological history of the Tulip tree (Liriodendron) have been frequently attempted and a fairly detailed summary (1) was presented in 1923, but "time marches on" and discovery is not halted by the publication of a book, in fact, quite the reverse is true. In particular the last few years have seen various gaps in the record closed, especially in the Tertiary of western North America. My first scientific paper, published in 1896, was on the leaves of Liriodendron and the variations in the leaves of our existing species of the eastern United States has been an annual pleasure.

Liriodendron was abundant and varied in the upper Cretaceous of the western interior of North America, but no indubitable records of Tertiary age from this continent have been available until recently. It is true that Chaney ascribed a leaf fragment (2) from the Eagle Creek formation to this genus in 1920 but this record, although probably correct, lacks conclusiveness; and the same may be said of another fragmentary specimen from the upper Eocene of British Columbia which I recorded (3) in 1926. In 1929, however, I published an account (4) of a Miocene species—*Liriodendron hesperia* from the Latah Miocene formation of the State of Washington. This was based upon perfect characteristic carpels which are essentially modern in their features. More recently Brown has figured additional carpels from this same locality together with a fragmentary leaf (5).

Among the Latah Miocene materials remaining in my hands are several specimens of carpels from the type locality and a leaf fragment from the Latah at Vera a few miles distant.

The latter is not especially like the leaf fragment which Brown figured from the Spokane locality, but having in mind the well-known variation in the leaves of the existing species it seems improbable that more than a single species was represented in Latah time.

The question will perhaps arise in the mind of some starry eyed botanist lacking a chronological sense why these Miocene leaves are not specifically identical with the existing species? and the answer is, or so it seems to me, that they could be, only you would be faced with the insuperable difficulty, at least to me, of consider-



ing that the existing species originated in Mid-Cretaceous times, since the latter can certainly for the most part be matched by variants among the leaves of the existing species, which is a pre-Darwinian conception of the fixity and immortality of species which is as outmoded at the present time as is Noah's flood. The accompanying illustrations show two carpels of *Liriodendron hesperia* from the Brickyard locality at Spokane (Figs. 1, 2), a fragmentary leaf from the Vera locality that is referred to the same species (Fig. 3) and a similar leaf of *Liriodendron tulipifera* from a spring shoot of a sapling (Fig. 4). The resemblances between the last, both in form and venation are obvious.

There are two existing species of Liriodendron—one in central China and our familiar tree of the southeastern United States—those two regions that are botanically so similar and share so many arborescent genera that are found only in these two regions (*e.g.,* Gordonia, Hicoria, Magnolia, Sassafras, Nyssa, etc.).

In this connection attention should be called to two Liriodendron leaves recorded (6) by Endo in 1934 from the Neogene of Japan under the name of *Liriodendron honsyûensis,* and also to carpels which Endo has described (7) from the Miocene of Korea (Tyôsen) as *Liriodendron meisenensis* and which he states differ from those of *L. hesperia.* These discoveries in Japan and Washington state help to bridge the gap of about 160° of longitude between our existing *Liriodendron tulipifera* Linné and *L. chinensis* Sargent.

The leaves described as *Liriodendron honsyûensis* from Japan are definitely different from those ascribed to *Liriodendron hesperia* from Washington, but because of the sparseness of material it is impossible to know their respective limits of variation and for the same reason it cannot be determined whether the Japanese fossil leaves should be regarded as more closely related to the existing Chinese tree, and the same remark applies to the degree of affinity of *Liriodendron hesperia* as between the existing species of China and that of the southeastern United States. There is some evidence in the Mesophytic floras of our Pacific slope Miocene of a closer relationship with existing eastern Asiatic floras than with existing southeastern American floras. This evidence is highly suggestive but from the nature of the material cannot be susceptible of proof.

This evidence is of two sorts, (1) where the genus survives in both regions the fossil form is more like a modern Asiatic than a modern American species. Examples are *Castanea orientalis* Chaney and *Castanea crenata* Sieb. and Zucc. of Japan; *Styrax* n.sp. Berry and *Styrax japonicum* Sieb. and Zucc. of Japan; *Betula largei* Knowlton and *Betula luminifera* Winkler; *Rhus merrilli* Chaney and *Rhus sylvestris* Sieb. and Zucc.; *Malus idahoensis* Brown and *Malus prunifolia* Willd.; *Fraxinus idahoensis* Brown and *Fraxinus inopinata* Ligelsh. and *platypoda* Oliver of eastern Asia. (2) where the genus is no longer represented in America. Examples are *Ailanthus americana* Ckl. and *Ailanthus glandulosus* Desf. of China, *Paliurus hesperius* Berry and *Paliurus orientalis; Cercidophyllum crenatum* (Unger) Brown and *Cercidophyllum japonicum* Sieb. and Zucc.; *Keteleeria heterophylloides* (Berry) Brown and *Keteleeria davidiana* Beissner; *Dipteronia americana* Brown and *Dipteronia sinensis* Oliver; *Trapa americana* Knowlton and the Asiatic *Trapa bicornis* L. and *bispinosa* Roxburg.

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Growing Cladophora in the Laboratory

I. C. G. Cooper

After several abortive attempts to keep *Cladophora* alive in the laboratory, the writer has used the apparatus shown in Figure 1 with success.

C. glomerata (L.) Kützing is a plant of well aerated waters, in fact the specimens used were gathered from rocks below a weir where they were constantly splashed. The device was conceived with the idea of furnishing aeration and possibly some motion in the fluid.

The contrivance is simple to construct and operate. On a shelf about 27″ above the laboratory table is placed a one-gallon bottle (A) with a siphon tube of ¼″ o.d. rubber (B) which has its outer end steadied by passing it through a 5/16″ hole in the wooden support (C), and which is in turn secured by the clamp (D) to the edge of the shelf. Immediately beneath the siphon tube a 5/16″ hole in the shelf forms a support for the thistle tube (F). To the lower end of the thistle tube a glass "tee" (G) is attached by a 2″ length of rubber tube (H). The stand (S) is made of wooden battens ¾″ x 1½″ and is 10″ high with top batten about 7″ long, having two 5/16″ holes about 5″ apart through which are passed the rubber tube (J) attached to the lower end of the "tee" and the glass tube (M) which is joined to the branch of the "tee" by the rubber tube (L). The tube (J) is led to the bottom of a 16 oz. flask (K) which is stood in a beaker (T). The glass tube (M) extends to the bottom of the 250 c.c. flask (N).

The end of the siphon tube (B) is plugged with a conical plug at E. Details of this plug are shown at E′. The plug in use is made of maple and is 1″ long and a little less than ¼″ diameter at the thick end. That end is cut flat and with fairly sharp edges. Grooves are cut in the sides as shown. These grooves do not extend closer to the thick end than ¼″.

To start operations, fill bottle A seven-eighths full and flask K completely with water and place about 200 c.c. of nutrient fluid in flask N. Set the siphon going and adjust the plug E until the speed of dripping is about three drops in five seconds. Now arrange the support C so that the drops fall directly into the throat of the thistle tube.

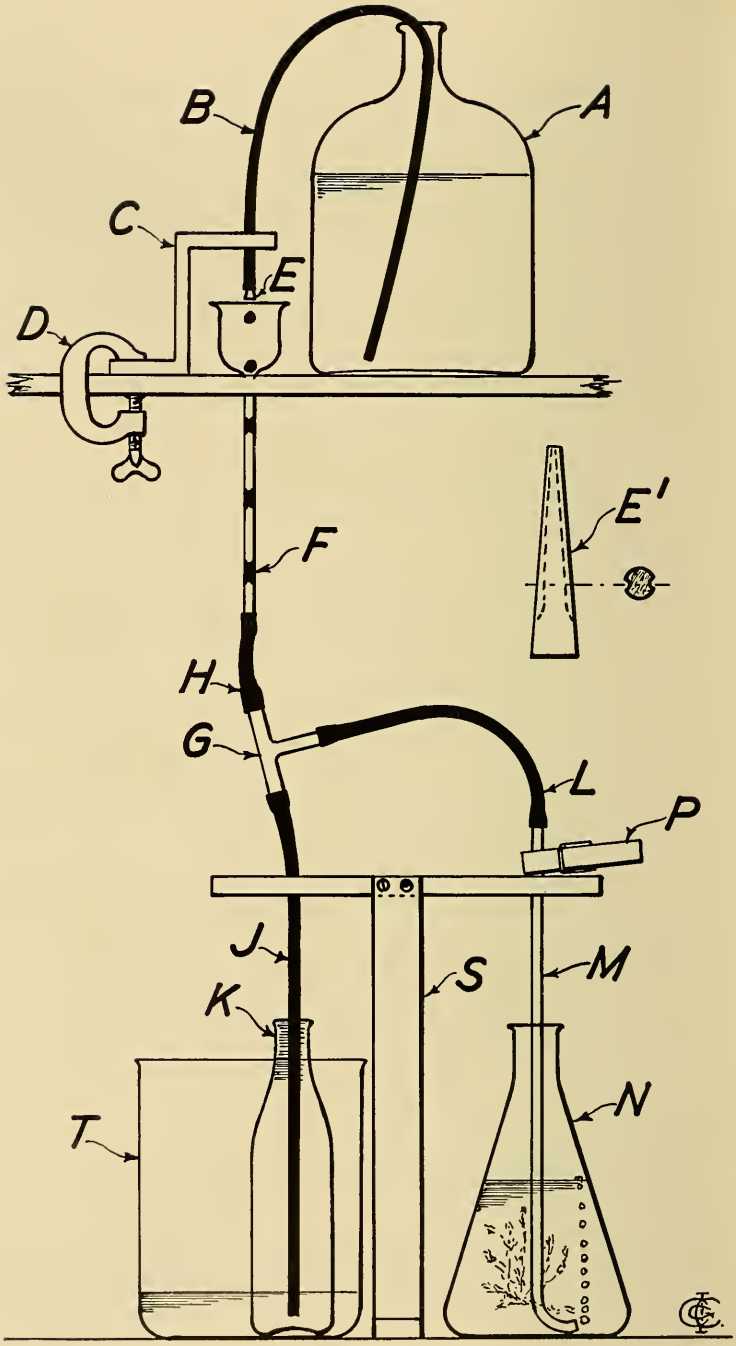

FIGURE 1

Since the tube M has its lower end immersed in about two inches of fluid, a definite pressure is required to force air from it. The lower end of tube J is sealed by the water in K. Therefore, when a drop of water from E falls into the tube F it forms a slug which slightly compresses the air trapped in the system and the slug comes to rest a little below the throat of the thistle. The next drop, falling squarely into the upper end of F traps a slug of air, and the first slug of water moves down further compressing air in the system, while the second slug slides into the tube above the intercepted air. The fourth or fifth drop will so increase the pressure that the air in tube L–M will burst through the liquid in the flask N in a series of bubbles, agitating the contents of the flask and allowing the slugs of air and water in F to travel downwards rapidly until the reduced pressure is again balanced by the fluid over the bottom end of M. Slugs of water which pass into the "tee" G flow downwards into J and overflow from K into T.

Some simple adjustments may be necessary. A nice balance between the pressures in the two lower tubes J and M is required. The immersed length of tube J must exceed the immersed length of M by an inch or so, to ensure sufficient back pressure to overcome the resistance in M and permit some oscillation in the air volume. The flask K, therefore, should be not less than 6″ tall. The relative vertical positions of K and N may require adjustment by setting one or the other on a wooden block. The greatest difficulty is to ensure that no water from F passes into L and thence into N. Any such addition to N will spoil the adjustment of the nutrient fluid. If the "tee" G is left in a vertical position the capillary action of the branch and the velocity of air in the tube will carry a part of every water slug into L. By moving the whole of the bottom set-up sideways and securing the tube M at a correct height by means of the spring clothes-pin P, it was found possible to cause the water slugs to break in G so that the liquid ran down the side away from the branch. The film on the branch side also broke at the entrance to the branch and any water splashed into the branch flowed back into J. Any contamination of the water causing soapiness will also cause water to be carried into the branch through the film not breaking at the entrance.

It is advisable not to cut the grooves in the plug E too deeply at first; gradually deepen or add grooves as found necessary in

order to get the required speed of drip. The height of E above the thistle should be about 1¾″ to 2″. When properly positioned the drop traps the air slug with a characteristic *bop*. Unless the drops fall squarely the water will run directly down the tube into K without pumping air. Occasional adjustments are found to be necessary as the plug swells or becomes foul.

As described, the apparatus will use about a gallon of water a day. The writer siphons the overflow in T night and morning and replaces it in A. Occasionally an additional half-pint is added to make up for evaporation.

The equipment should be run for several hours before placing the plants in the nutrient solution.

The device was set going in September and the specimens remained in the water in which it was collected, with slight additions of tap water to make up for evaporation. At the end of four months the specimen was fresh, and there was no accumulation of bacterial scum. The water was then replaced with Detmer's solution, concentration 6 per 10,000, and now (February) the plant is showing growth.

The writer contemplates setting up a battery of these aerating devices in which water directly from the tap will be used by passing it through a header having small branches and stop cocks and using drig plugs of glass or plastic material. The present "tees" will be replaced with some having much larger diameter so that the change of sectional area will ensure every water slug being broken. The flasks (K) will overflow directly into a drain. Such an outfit should require practically no attention.

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FIELD TRIPS OF THE CLUB

Trip of July 5–7, 1940, to the Pennsylvania State College Nature Camp, Seven Sister Mountains, Pa.

Upon arrival at the camp in the midst of a forest preserve, the seven members and guests were cordially greeted by Prof. George R. Green, Director of the Nature Camp, and his staff, Miss Farida A. Wiley, Dr. Oliver P. Medsger and Prof. George J. Free.

After dinner the spacious grounds of camp attracted us. Nests of five species of birds were pointed out; several table mountain pines, *Pinus pungens,* about fifteen feet high, with mature, nearly round, heavy cones persisting and branches crowded with short, bluish leaves, most picturesque trees; also thyme-leaved sandwort, *Arenaria serphyllifolia;* and narrow-leaved vervain, *Verbena angustifolia.*

In the evening Professor Green gave an illustrated lecture on "Forestry." Many of his pictures were taken at camp. Later, the stillness of night was occasionally broken by the hooting of barred owls from the mountain sides.

Saturday morning under the leadership of Professor Green and his staff we followed the Johnson Trail into the forest. Here a chorus of cicadas, the seventeen-year locusts, attracted our attention. They were abundant also about camp and in many places the dead terminals, particularly of the oaks, showed evidence of their egg-laying. Pine and coral-winged cicadas were also identified.

The trees were studied in detail, with particular attention to the bark formation. They were mostly butternut, American linden, tupelo, oaks, the cucumber tree *Magnolia acuminata,* and farther on hemlocks. Many mosses were identified. A red-bellied brown snake was found and examined. A long snake-shed, discovered on the trunk of a large white oak, about seventy feet from the ground, caused all to marvel why a snake should climb to such a place to shed its skin. Upon further examination a smaller shed was found a little higher on the tree. Presently, a long pilot black snake was seen slowly and carefully coming down the tree head first on the upper side of the very slightly sloping trunk, depending entirely upon the roughness of the bark to descend, there being no branches or other irregularities. All gathered around and cameras began to click. When the snake came within reach Professor Green caught her and found she measured four feet six inches long. He opened her mouth to show the double row of upper teeth and the single row below, characteristic of non-poisonous snakes. When released she seemed not at all frightened by this demonstration.

There were few flowering plants here, *Mitchella repens, Monotropa uniflora,* and *Circaea alpina* in bloom; plants of golden saxifrage, *Chrysosplenium americanum;* and ferns, maidenhair, and two spleenworts, ebony and narrow-leaved.

In the afternoon Miss Wiley led us along the Alan Seeger Trail, the first part of which was open forest. Here we saw our first pileated woodpecker although we had heard them before and observed many places where they had been excavating for larvae. Tall plants of *Rhododendron maximum,* some in full bloom, were photographed at close range. Farther on, the rhododendron in the swamp was blooming, this year, somewhat sparsely. Far out in the swamp we heard the humming of thousands of bees and saw them going in and out through a small hole high up in a "bee tree." Beside our trail were several large trees, a Juneberry, *Amelanchier canadensis,* with a trunk 9¼ inches in diameter at four feet from the ground, and two hemlocks, *Tsuga canadensis,* one 11½ feet in circumference, the other 13½ feet. Beyond in the woods was a twayblade, *Listera Smallii,* about five inches tall in bud. Later, at another location, there were several in bloom.

After supper all drove to the mountain-top to see the sunset and the display of mountain laurel. *Kalmia latifolia.* At 2,400 feet altitude the whole mountain seemed to have burst into bloom, for as far as one could see back among the scattered, low trees were masses of laurel everywhere, acres and acres in its prime. Our attention was called to the beeswax odor of the laurel which was surprisingly pronounced. During our return the whippoorwills were singing and greeted us also as we reached camp.

On Sunday two special trips were planned for our party. First, Dr. Medsger took us to "Beaver Meadows," a swamp area two miles long, formerly dammed by beavers, though none are there now. The trail led among large red spruce, *Picea rubra;* balsam, *Abies balsamea;* mountain ash, *Pyrus americana;* larch, *Larix laricina;* Juneberry, *Amelanchier canadensis;* masses of *Rhododendron maximum;* mountain holly, *Nemopanthus mucronata;* buckthorn, *Rhamnus;* and mountain laurel, *Kalmia latifolia.* One of our objectives here was the Massachusetts fern growing in great abundance in association with the New York fern. Plants of gold thread, *Coptis trifolia;* trailing arbutus, *Epigaea repens;* painted trillium, *Trillium undulatum;* a fungus, *Amanitopsis vaginata,* were seen and in the wetter places round-leaved sundew, *Drosera rotundifolia;* hispid blackberry, *Rubus hispidus;* and in bloom, winterberry, *Ilex verticillata.* Perhaps most attractive of all were two species, Small's twayblade, *Listera Smallii,* several in bloom

showing the delicate texture of the brownish, cleft lip, and on a wooded slope several plants of the rare whorled pogonia, *Pogonia verticillata,* in seed. On the mountainside several chestnut sprouts, *Castanea dentata,* about twenty-five feet high were in full bloom. Near camp Dr. Medsger pointed out two maples that had formed a natural graft about ten feet from the ground, also sweet pinesap, *Monotropa hypopitys,* in bloom with thirty-one plants in a cluster.

After dinner under Miss Wiley's guidance we noted the long-leaved houstonia, *Houstonia longifolia; Botrychium lanceolatum;* another pilot black snake in a tree with black-capped chickadees and pine warblers protesting; and in a planting of several species of pines slender ladies tresses, *Spiranthes gracilis,* not yet in bloom.

After supper all drove to a fire-tower lookout, which commanded an extensive view of the Seven Sister Mountain tops. Mountain laurel, some tall and tree-like, was much admired and on the Fire-Warden's grounds large plants of *Viola fimbriatula* bearing many ripe capsules from the petaliferous and cleistogamous flowers attracted attention.

After returning from the mountain, all joined in a short religious service led by Professor Free and Dr. Medsger.

We stayed until the eighth to participate in an early morning bird walk which Professor Green had arranged for the students and for our benefit. With Miss Wiley and Professor Free as leaders we added several species to our list, including a male cardinal that gave us a beautiful performance, making a total for the week-end of forty-nine species and nests of ten. Nests attracting the most attention were those of an indigo bunting containing four eggs, one of which was a cowbird's, a Louisiana water-thrush in the roots of an upturned tree, and a wood thrush about thirty feet up in a hemlock, a surprisingly high situation for the species.

Those visiting the Camp were much impressed by its ideal situation for the study of nature, where college credits can be earned and individual problems pursued under expert guidance. We wish to extend our thanks to Professor Green for his cordial hospitality and for leaving nothing undone that might contribute to the success of our week-end visit; and to our trail leaders for their friendly enthusiasm and expert assistance in pointing out details of that forest environment, so rich botanically as well as in its general fauna.

EDITH DAY CHUBB

Trip of August 25 to Juniper Swamp and Idlewild

The August 25th field meeting of the Torrey Botanical Club to Juniper Swamp and Idlewild, Queens County, New York, N. Y., for the study and collection of grasses and sedges, occurred on a cool sunshiny day. The meeting point was Queens Boulevard and Woodhaven Boulevard. Our way was south along Woodhaven Boulevard and then across southwest to Caldwell Avenue where *Panicum latifolium* L. was pointed out in a patch of catbriers, a woodland species in very thrifty condition although not now sheltered by trees. The trees were cut off at least thirty years ago.

Soon we climbed down the steep bank of the New York Connecting Railroad to the tracks along which we walked south. On the left bank we soon passed many large tufts of *Deschampsia flexuosa* (L.) Trin. usually found on rocky ledges.

Toward the top of the dry bank, there was a large area of *Spartina pectinata* Link. probably a holdover from earlier years when this region was a part of the extensive Juniper Swamp. The natural habitat of this grass is along the edge of a slough or near ditches in a salt marsh or on the drier parts of such a marsh.

Before reaching Elliot Avenue just ahead of us, a few culms of a grass, two feet high, was collected alongside of the tracks, that no one in the group recognized at sight. With the help of Gray's Manual, we agreed that our grass was *Sporobolus cryptandrus* (Torr.) A. Gray which proved to be a species new to the western half of Long Island. This species was reported in House "Annotated List" as having been collected at Orient Point, eastern end of Long Island, many years ago.

A little further south we climbed the bank to the west, out of the railroad cut, crossed Elliot Avenue and approached the station for *Calamagrostis epigeios* var. *georgica* (C. Koch.) Ledeb. located partly on a sloping bank, and partly on the level of the swamp and near the railroad cut. This station was discovered by the writer in late fall of 1936 in a condition too much battered by early fall rains for certain identification. The following spring this grass was easily identified and the identification was verified by Mrs. Agnes Chase, Senior Agrostologist of the Smithsonian Institution. This species had been known for a number of years from a station in Massachusetts, Barnstable County; and, more recently from a smaller area in eastern Pennsylvania, northwest of Philadelphia. The

grass in Juniper Swamp was a variety new to the state of New York. This variety is smaller in every way than the species *Calamagrostis epigeios* (L.) Roth. a grass native in some of the European countries along the Mediterranean Sea. This latter grass has been introduced into this country through its use as packing between slabs of marble from the quarries of Carrara, Italy, and, may be seen in a marble yard on the west side of Vernon Avenue, a mile and a half north of Queensboro bridge along the East River. The Juniper Swamp Station for the variety is located in an area destined to become a city park and already (1937) filling operations had approached within a hundred yards of this patch of grass, new to the state. In time our newly discovered grass would be covered with tons of plaster, broken bricks and other refuse. To avoid extinction of this grass, quick action had to be taken. Late in the fall (1937) sixty small sods were dug from the area covered by this grass and these were transplanted in small patches along the sloping sides of the railroad cut, one hundred feet away. All these sods lived and thrived amazingly. Three years later, the transplanted sods occupy several times the area they did when first set out. The sloping sides of a railroad cut are seldom disturbed in such a way as to destroy a grass covering. In such a location, our new grass will probably thrive as long as the railroad exists.

Among the grasses seen along the railroad cut were *Agropyron repens* (L.) Beauv., *Arrhenatherum elatius* (L.) Mert. and Koch., *Danthonia spicata* (L.) Beauv., *Eragrostis spectabilis* (Pursh) Steud., and *Leersia oryzoides* (L.) Swartz, especially interesting because of its cleistogamic flowers. Our way now led along the track, south to the next overhead bridge where we climbed the bank out of the railroad cut and proceeded along the road to the trolley line near the cemetery on Metropolitan Avenue. The trolley took us about a mile to Woodhaven Boulevard where we boarded a Howard Beach bus and at Liberty Avenue changed to the Rockaway Boulevard bus line. This bus took us through Ozone Park to Baisley Park where we changed to the bus from Jamaica and rode a short distance to 157th Street. This street is the road that crosses Idlewild golf course and on to Idlewild Point. A few blocks down this road brought us to an open grassy area on the left partly covered by bushes and close to the golf links. Here we saw *Corynephorus canescens* (L.) Beauv., an annual grass new to most

of the party, introduced from Europe and known elsewhere in the United States from the vicinity of Philadelphia and Martha's Vineyard, Mass. Eugene P. Bicknell first collected this grass, not previously known for the United States, on Long Island near Hempstead reservoir, June, 1903; and he published an account of this species in Rhodora, 1914, p. 81.

After lunch, eaten close by a golf club green, we walked toward Idlewild Point. On the way we passed clumps of various grasses: *Digitaria filiformis* (L.) Koel., *Paspalum pubescens* Muhl., *Sorghastrum nutans* (L.) Nash, *Distichlis spicata* (L.) Greene (a dioecious species), *Spartina patens* (Ait.) Muhl., *Spartina patens* var. *caespitosa* (A. A. Eaton) Hitchc., *Spartina alterniflora* Lois., *Phragmites communis* Trin., *Tripsacum dactyloides* (L.) L., *Echinochloa muricata* (Michx.) Fernald, *Andropogon littoralis* Nash., *Ammophila breviligulata* Fernald, and many others of a less exciting character.

Idlewild Point is a wide stretch of gravelly sand that extends half a mile out into Jamaica Bay. Years ago it was a small popular resort with hotel, cottages and bathing facilities, but is now deserted because of the polluted condition of the bay.

In this area the first interesting grass was *Triplasis purpurea* (Walt.) Chapm. easily overlooked but interesting because of the cleistogamic flowers found in the leaf sheaths at the base of the culms. Further on we saw *Panicum oricola* Hitchc. and Chase, *P. dichotomiflorum* Michx., *P. virgatum* L., *P. clandestinum* L., *P. sphaerocarpon* Ell., *Agrostis hiemalis* (Walt.) B. S. P., on the higher parts of the sandy area, and Spartina species along the edge of the water.

At the end of the point close to the water there is a station for another European grass, *Elymus arenarius* L., and the only known station for this species in North America. This species differs from *E. mollis* Trin., a dune grass distributed along the eastern coast of North America, Massachusetts to Greenland, in having the culm smooth below the spike and glabrous glumes (verified by Mrs. Chase). Close by were a few culms of *Elymus virginicus* var. *halophilus* (Bickn.) Wiegand.

It was good to rest a while by the waters of the bay and watch the antics of the shorebirds feeding nearby. During this period grasses from other nearby regions were displayed .

From the Palisades, N. J.—*Brachyelytrum erectum* (Schreb.) Beauv., *Panicum polyanthes* Schult., *P. boscii* Poir., *Elymus canadensis* L., *Aristida longespica* Poir., *Leersia virginica* Willd., and *Erianthus alopecuroides* (L.) Ell. Of this last species, Witmer Stone says in his "Plants of Southern New Jersey": "This species is certainly very rare in the State." No stations for it being known to him at the time he wrote his book.

From north shore of Long Island at Plandome—*Panicum amarum* Ell.

From near the propagating houses, New York Botanical Garden *Paspalum longipilum* Nash. and *Arthraxon hispidus* var. *cryptatherus* (Hack.) Honda., an annual, introduced from the Orient and more common from Pennsylvania south to Florida, not yet listed as occurring in New York State.

After our short rest we started back along the road we came and proceeded to a point just south of the golf course and then (the tide being at ebb) we turned right, across the marsh to follow paths in use every day by neighborhood workers as short cuts. Along a shallow ditch we stopped to look over specimens of *Hierochloë odorata* (L.) Beauv., Holy grass, Vanilla grass, Sweet grass. The Indians use this grass, known as Seneca grass, to make fragrant baskets. This species blooms early, April to May, and at this time (late August) is dry and brown. Just beyond there was a stand of *Spartina cynosuroides* (L.) Roth., the tallest species of this genus found in this region.

Still further along these paths through the marsh we saw *Cinna arundinacea* L., *Calamagrostis canadensis* (Michx.) Beauv., *C. cinnoides* (Muhl.) Barton, *Echinochloa walteri* (Pursh) Heller, *Panicum barbulatum* Michx., *P. dichotonum* L., *P. verrucosum* Muhl. and *Glyceria striata* (Lam.) Hitchc.

Agricultural and common weedy grasses to the number of thirty-five species not listed by name in this report were seen and commented upon during the trip. In all over eighty different species of grass were seen and pointed out to members of this field party during the day.

The names of species used in this report are those found in Hitchcock's "Manual of the Grasses of the United States."

An excellent review of studies made on cleistogamic flowers by Professor Uphof of Rollins College, appears in *The Botanical Review* for January, 1938.

Eleven members including the guides were present on this field trip which ended at the bus on Rockaway Boulevard about 7:30 P.M.

A. T. Beals

Cyperaceae and Juncaceae Collected on the Torrey Trip, August 25, 1940

A. Alluvial ditch at Middle Village, L. I., N. Y

Cyperus strigosus L. Abundant.

Eleocharis obtusa (Willd.) Schultes.

Eleocharis olivacea Torr. Growing in ditch with *Heteranthera reniformis* R. and P.

Scirpus americanus Pers. Abundant.

Scirpus cyperinus (L.) Kunth.

Carex lurida Wahlenb.

B. Salt marshes near Idlewild, L. I., N. Y.

Cyperus Nuttallii Eddy. Abundant all over salt flats.

Cyperus ovularis (Michx.) Torr.

Cyperus cylindricus (Ell.) Britton. The above two species abundant in dry regions.

Cyperus speciosus Vahl. Edge of marsh.

Cyperus strigosus L. Edge of marsh.

Eleocharis capitata (L.) R. Br.

Scirpus robustus Pursh. Along a creek with *Spartina glabra.*

Scleria triglomerata Michx. An extensive colony along the edge of marsh with *Blephariglottis.*

Stenophyllus capillaris (L.) Britton. On dry sterile edges of the marsh.

Carex scoparia Schkuhr. Remains.

Juncus acuminatus Michx. Abundant.

C. Ballasted sand flats.

Carex silicea Olney. Nine large colonies were seen.

Juncus greenei Oakes and Tuckerm. Three small colonies.

Wm. H. Wiegmann

The Non-glumaceous Plants

The primary objective of the trip was a study of the chaffy or glumaceous series of herbs, such as Poaceae and Cyperaceae. Other plants, from the royal-blooming cohorts and red-fruited shrubs down to the tiny mealy flowers of pigweeds were merely an incidental background to this. Thus, in this section of the trip's account only secondary importance is to be given.

The trip really consisted of two trips, one to the Juniper Swamp with its weed-association (indeed, *Chamaedaphne calyculata* used to grow here several years ago, but those days are now gone) and the other to the far removed Idlewild with its orchids.

The broader leaved Blue Curls and *Crotolaria sagittalis* grew in dry soil in the first locality. Our most interesting find was in a ditch near the side of a railroad. Here, in a habitat of *Alisma subcordatum, Ranunculus sceleratus* and *Triadenum virginicum* (relic of the *Chamaedaphne* days) flourished *Heteranthera reniformis, Mud-Plantain,* with flowers yet infolded within the spathe. Taylor in his "Flora of the Vicinity of New York," gives its local New York distribution: "In the Hudson from Dutchess Co. northward." The Local Herb. in the New York Botanical Garden has no representative from New York State; the Britton Herb. has sheets from Ulster and Greene counties. Some weeds of the roadside observed en route to Idlewild were: *Reynoutria japonica* Houtt. (*Polygonum cuspidatum*), *Padus virginiana* (filled to the gills with cherries), *Galinsoga aristulata* Bicknell ex descr., *Phytolacca* (also berried), *Potentilla recta, Saponaria, Scleranthus, Leptilon, Convolvulus sepium, C. arvensis, Commelina communis, Persicaria pennsylvanica, Medicago lupulina, M. sativa,* the great fragrant *Melilotus alba,* the loveliest blue of *Cichorium,* and hosts of other weeds. A little removed from the road we spied a colony of *Vernonia,* deep-purple flowered, and an enmassed yellow of several species of goldenrods, entwined with *Amphicarpa bracteata* (L.) Fernald and flowering *Apios americana* Medic.

In the northwest corner of the Idlewild Beach Golf Club, near 146th and Idlewild Road, we landed in one of the most remarkable stations of our trip. Here, heralded by *Vaccinium corymbosum*—or shall we state this luscious berried one as *Vaccinium angustifolium* Ait. × *V. arkansanum* Ashe × *V. australe* Small?

to express its true nature, as W. H. Camp does in "The American Midland Naturalist," Vol. 23, p. 177, 1940—by the High Bush, with *Lycopodium inundatum, Xyris flexuosa* and Hairy-cap Moss, grew plentifully, *Drosera intermedia!* Roundabout were *Rhexia virginica* and *Gratiola aurea* and further away from this island of remarkable associations for our city (as she is now) were many just plain lovely blooms, such as *Desmodium canadense, D. ciliare, Ludwigia alternifolia,* Bugle-weed, Joe Pye Weed, *Euthamia graminifolia, E. tenuifolia,* two Sensitive Peas, *Chamaecrista nictitans* and the showy *C. fasciculata* and *Agalinis purpurea* near an area of long-peduncled *Strophostyles umbellata.* The Button-weed was a new plant to some of the group who had not seen *Diodia teres* before. *Teucrium canadense* and *Sanguisorba canadensis* were preent in some abundance. A *Cuscuta pentagona* Engelmann (*C. arvensis*), with its inflexed corolla tips and pale stem, had the scales within its corolla tube greatly reduced, almost lacking, and not at all typically "prominently fringed." On the lawns leading to the golf course grew the Cat's-ear, *Hypochaeris radicata.*

The walk to the sandy point was drab in comparison. White-flowered *Datura stramonium, Cycloloma atriplicifolium, Strophostyles helvola,* were on the road, and at the edge of the marsh *Iva, Baccharis, Polygonum exsertum, Dondia, Salicornia, Atriplex hastata. Tissa marina* offered an observation worthy of note; its petals are bicolored, lavender at the periphery and white near the center or eye of the bloom. At a distance of several feet, especially in the strong sunlight, these flowers appear white, whereas at close inspection their dainty lavender is the conspicuous hue. In the sand dunes near the bay an herb was taken for Polygonum, but the dry-sand habitat and the old flower stalks with their unique articulations made the writer suspect it to be *Polygonella articulata,* if so, a good station for the city.

The last high light of the trip, the most beautiful, was met when we penetrated the marshes deeply, leaping over drainage ditches and dodging through *Rhus vernix* and passing *Helenium autumnale,* the yellow-centered Sneezeweed that was profuse in this locality with *Helianthus angustifolius* as a partner The Helenium species is not a common plant within the confines of the city. Other high lights of this marsh were the colorful hues of *Hibiscus moscheutos* and the fruits of *Rhus glabra.* Further on

we discovered an area of the Yellow-fringed Orchid, *Blephariglottis ciliaris,* legions of them. And they were amidst the whites of *Eupatorium verbenaefolium,* Clethra, *Doellingeria umbellata.* A land form of *Sium suave* Walt., simulated *Oxypolis rigidior* (L.) Raf. that was roundabout. Dwarf *Hypericum canadense* with about fifteen stamens, not the five to ten of description, was a little problem. *Helianthus angustifolius* was common, as *H. giganteus* had been nearer the road previously. *Lacinaria spicata,* in legions, purple spiked, was the showiest flower of the day. We had seen it earlier in the trip growing with *Lacinaria scariosa* and an intermediate hybrid, but not rampant as here. The golden pyramids of *Solidago odora* were a fitting complement to the orchid; and at a distance was a pink haze of *Sabbatia campanulata;* and the capsules of *Iris prismatica* were at our feet.

Our Sabbatia somewhat approached the characters of *Sabbatia campanulata* var. *amoena* (Raf.) comb. nov.* (*Chironia amoena* Raf.; *Sabbatia amoena* G. Don.; *Chironia stellaris* Muhl.; *Sabbatia stellaris* Pursh). The manual characters differentiating *Sabbatia campanulata* from its variety *amoena* are worthless, as pointed out by Bicknell whose opinion was endorsed by Fernald (Rhodora, Vol. 18), who offered a new set of key-differences according to which our Marsh Pink agrees with campanulata in its subclasping leaves and no discoloration upon drying, but disagree in the fact that it was growing in a *Spartina cynosuroides* salt-marsh (not in "sandy pondshores or sphagnum bogs"). Jos. Monachino

Agricultural and Weedy Grasses Pointed Out and Discussed on the August 25, 1940, Torrey Botanical Club Field Meeting

Bromus inermis Leyss. Smooth Brome.
Bromus secalinus L. Chess.
Bromus commutatus Schrad. Hairy Chess.
Bromus tectorum L. Downy Chess.
Festuca elatior L. Meadow Fescue.
Festuca rubra L. Red Fescue.
Festuca ovina L. Sheep Fescue.
Poa annua L. Annual Bluegrass.
Poa compressa L. Canada Bluegrass.

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* *Sabbatia campanulata* var. ***amoena*** (Raf.) Monachino, comb. nov.; *Chironia amoena* Raf. Med. Rep. **5**: 359, 1808.

Poa pratensis L. Kentucky Bluegrass.
Eragrostis pectinacea (Michx.) Nees. A low weed in waste places.
Eragrostis cilianensis (All.) Link. Stinkgrass.
Dactylis glomerata L. Orchard Grass.
Triodia flava (L.) Smyth. Purpletop.
Lolium perenne L. Perennial Ryegrass.
Lolium multiflorum Lam. Italian Ryegrass.
Avena sativa L. Oat.
Agrostis alba L. Redtop.
Agrostis perennans (Walt.) Tuckerm. Autumn Bent.
Phleum pratense L. Timothy.
Muhlenbergia mexicana (L.) Trin. Wirestem Muhly.
Muhlenbergia Schreberi Gmel. Nimblewill.
Eleusine indica (L.) Gaertn. Goosegrass.
Anthoxanthum odoratum L. Sweet Vernalgrass.
Digitaria sanguinalis (L.) Scop. Crab Grass.
Digitaria ischaemum (Schreb.) Muhl. Smooth Crabgrass.
Panicum microcarpon Muhl.
Panicum capillare L. Witchgrass.
Echinochloa crusgalli (L.) Beauv. Barnyard Grass.
Echinochloa crusgalli var. *mitis* (Pursh) Peterm.
Setaria lutescens (Weigel) F. T. Hubb. Yellow Bristlegrass.
Setaria verticillata (L.) Beauv. Bur Bristlegrass
Setaria viridis (L.) Beauv. Green Bristlegrass.
Cenchrus pauciflorus Benth. Field Sandbur.
Cenchrus tribuloides L. Dune Sandbur.
Andropogon scoparius Michx. Prairie Beardgrass.
Andropogon virginicus L. Broomsedge.

Trip of November 3, 1940, to Anthony's Nose, N. Y.

Eight members and guests of the Club climbed Anthony's Nose on a day which alternated bright sunshine with clouds, strong gusts of wind and light showers. Although fires during recent years had swept the west face of the mountain, a respectable list of lichens was found. On the rocks of the higher levels were three of the rock tripes: *Gyrophora Muhlenbergii, Umbilicaria pennsylvanica,* and *U. pustulata.* Many specimens of the latter were quite red on the upper surface. Is this a result of the forest fires or is it a normal color variation in this species? Also growing on the granitic rocks

were: *Rinodina orcina, Acarospora fuscata, Lecanora rubina, L. cinerea, Rhizocarpon petraeum* var. *confervoides, Parmelia conspersa, Amphiloma lanuginosum,* and *Biatorella clavus.* On the soil at the grassy edges of bare places near the top were several *Cladonias: C. cristatella* in ffs. *abbreviata, vestita* and *ramosa, C. chlorophaea* f. *simplex, C. bacillaris* ffs. *clavata* and *peritheta, C. pleurota, C. papillaria* f. *molariformis, C. apodocarpa, C. caespiticia, C. coniocraea* f. *ceratodes* and *C. squamosa. Urceolaria scuposa* var. *parasitica* was found on the *Cladonia* squamules in two places. A little *Peltigera sorediata* and some *Baeomyces roseus* were found, but the party was unsuccessful in searching for members of the Cladinae or Unciales groups of the genus *Cladonia.* Perhaps the fires had completely exterminated these. An old dry log yielded *Parmeliopsis aleurites* and an undetermined crustose lichen.

After lunching in a sheltered cove near the top of the mountain, the party continued northward along the Appalachian trail. *Peltigera sorediata* was fruiting on the clay roadbank near the moss *Buxbaumia aphylla* which was fruiting and in prime condition. Rock surfaces down which moisture was trickling yielded: *Dermatocarpon aquaticum, Lecidea albocaerulescens, Peltigera praetexta, Cladonia pityrea* and a species of *Collema.* The clay of the road was covered by *Dicranella heteromalla,* frequently interspersed with *Pogonatum brevicaule.* Along the edges *Cladonia mitrula* ffs. *imbricatula* and *pallida, C. verticillata* f. *evoluta, C. chlorophaea* ffs. *simplex* and *carpophora, C. nemoxyna* f. *phyllocephala, C. furcata,* and the liverworts *Ptilidium* and *Scapania* were picked up. At the base of oak trees *Physcia endochrysea* was common. *Cladonia delicata* and *C. borbonica* f. *cylindrica* were found on stumps. A surprise was a thallus of *Stereocaulon paschale* growing on a boulder at a low altitude, after it had been unsuccessfully sought on the rocks at the top of the mountain. Witch hazel was in full bloom; and a few tardy asters and a single bellflower blossom were the only angiosperms still flowering.

J. W. Thomson, Jr.

Trip of January 11, 1941, to New York Botanical Garden

Through the courtesy of Mr. Robert Hagelstein, Honorary Curator of Myxomycetes, and Mr. Joseph F. Burke, Honorary Curator of Diatomaceae, the Club visited the room that had been

set aside for the study of these groups in the newly rearranged cryptogamic section of the Museum Building at the New York Botanical Garden. We were particularly honored in that this date was selected for the formal opening of the room and the Chairman of the Field Committee was asked to preside. Dr. W. J. Robbins, Director of the Garden, spoke briefly emphasizing the important contributions that amateurs can make to the collection and study of plants. Dr. Fred Seaver, Curator of Cryptogams, drew attention to the advantage to the Garden in having non-professionals available who are specialists of such eminence that they can assume the supervision of a group of plants. Mr. Hagelstein mentioned the progressive attitude of the Garden in acquiring important collections when they became available. He stressed the need of continuously collecting and replacing myxomycete material. Mr. Burke paid tribute to Mr. Hagelstein's work with these groups of plants. A few moments later Mr. Burke was the speaker on the Garden's regular Saturday afternoon lecture series. He gave a fine talk, beautifully illustrated, on the habits and distinguishing characteristics of the Diatomaceae.

The dedicatory ceremony was held in the Members Room. About ninety people were present representing the Garden staff, the New York Microscopical Society, the Torrey Club, and other friends.

John A. Small

PROCEEDINGS OF THE CLUB

Minutes of the Meeting on January 15, 1941

The meeting was called to order at 3:30 P.M. by the President, Dr. J. S. Karling, at the New York Botanical Garden. Twenty-four members and friends were present. The minutes of the meeting on January 7 were read and approved with correction.

The death of Mr. Emil F. Heinold, 142–15 249th St., Rosedale, L. I., N. Y, in February, 1940, was reported to the Club.

The Recording Secretary was instructed to cast a unanimous ballot for the election of the following nominees to annual membership: Miss Jean C. Van Auken, 726 E. 27th St., Paterson, N. J.; Mrs. B. Tappen Fairchild, Cold Spring Harbor, L. I., N. Y.; Dr. Julian B. Acuna y Gale, Estacion Exp. Agronomica, Stgo. de las Vegas, Habana, Cuba; Mr. Frank F. Gander, Natural

History Museum, Balboa Park, San Diego, Calif.; Miss Lilian C. Heinold, 142–15 249th St., Rosedale, L. I., N. Y.; Miss H. Anna Kennedy, 30 Park Ave., South Weymouth, Mass.; Mr. Boris A. Krukoff, New York Botanical Garden, Bronx Park, New York, N. Y.; Brother Leon (Joseph Sylvestre Sauget), Colegio De La Salle, Vedado, Habana, Cuba.

The resignations of Dr. E. P. Meinecke, c/o Forest Service, 446 Phelan Building, San Francisco, Calif., from annual membership; and Miss Faye C. Horton, 3416 93rd St., Jackson Heights, N. Y.; Mr. W. D. Vanderbilt, 527 W. 121st St., New York, N. Y.; Mrs. S. S. Vanderbilt, 527 W. 121st St., New York, N. Y., from associate membership were accepted with regret.

The nomination of Dr. A. H. Graves, Dr. Ralph H. Cheney, and Dr. J. J. Copeland to serve on the auditing committee was announced by the President.

Dr. M. A. Raines of Howard University gave a lecture in the scientific part of the program on "Methods of Growing Plants in Water and in Air." The speaker's abstract follows:

A project to devise a method of growing plants especially suited for studying root growth by time-lapse motion picture photography has resulted in the development of the "Wick-Culture Technique"—in which the plant roots develop on the surface of a sheet of absorbent material (such as black blotting paper) supported in a nearly vertical position and supplied with water from above. In the preferred form of this set-up, the absorbent sheet rests against a sheet of plate glass, the roots developing between the absorbent sheet and the glass. The recent development of glass cloth greatly extends the possibilities of the wick-culture technique for investigations on root physiology and pathology.

Experience with a "Germinator for Root Work" (constructed on the principle of the set-up for wick culture) was taken to indicate that gentle washing of the surfaces of a plant situated in a moist chamber retards the development of mold on them. This has led to experimentation with a "Spray Chamber"—essentially a moist chamber equipped with facilities for subjecting plants contained in it to a spray of water. In the spray chamber plant turgor is not only maintained, but may be increased. An indication of the possibilities of the spray chamber is given by its successful use for obtaining abundant regeneration of roots on large leafy cuttings of willow, poplar, and other plants. On the debit side, it must be noted that prolonged washing may be harmful to the plant. A variation of the spray chamber is the "Aerated Moist Chamber" in which air is bubbled through water at the bottom of the moist chamber.

A second project, on methods of feeding soluble carbohydrates to plants, had led to the demonstration that this may be accomplished without steriliza-

tion or the use of aseptic precautions in the case of absorbing roots suspended in air—nutrient solution being supplied by occasional dipping or by a spray. Apparently, the carbohydrate is absorbed sufficiently rapidly to avoid deleterious development of bacteria or molds on the root surfaces.

On the theoretical side: Casting about for a unifying scheme for the many methods of growing plants, an experiment by Julius Sachs (1874) on the growth of roots in air, in water, and in soil is recalled, from which Sachs concluded that roots develop best when they are supplied both air and water in easily available form—that is, water in the liquid form, and air in the form of free gas. His experiment also indicated that air and water may be supplied separately, the root being now in air and now in water. Proceeding on the suggestion contained in this experiment by Sachs, a canvass is made of possible culture methods for plants according to the form in which air and water are supplied to the plant roots, and it is noted how readily the various methods, old and new, of growing plants fit into this scheme.

The meeting was adjourned at 4:40 P.M.

Respectfully submitted,
John W. Thomson, Jr.
Recording Secretary

NEWS NOTES

Mr. G. C. Nearing who has been a frequent contributor to Torreya on the topic of lichens announces the first of a series of a sixteen-page section that will comprise his volume "The Lichen Book." The entire book will contain thirty groups and the first twelve are now nearly completed. The drawings will appear alongside the description which will enhance the usefulness of the book. The material that appeared in Torreya will be extended since new forms have been collected. The system of keys will consist of thirty-five charts most of them double paged. About 500 species will be described and the finished book will be close to 400 pages.

Mr. Nearing will assume publication of the series and the terms of subscription are $1.00 in advance for five sections of sixteen pages. The entire publication cost not to exceed $5.00. The sections as issued will be loose and unbound. When the series are completed the subscriber will receive, in addition to the loose-leaf sections, a complete book bound in cloth. It is estimated that a period of three years will be necessary to complete the work. Mr. Nearing will endeavor to keep the series as a beginner's book for quick reference. Cross references will anticipate likely confusions.

THE TORREY BOTANICAL CLUB

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Correspondence relating to the above publications should be addressed to

WILLIAM G. WHALEY,
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Volume 41 July-August, 1941 Number 4

TORREYA

A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

WILLIAM J. BONISTEEL

John Torrey, 1796-1873

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TORREYA

Vol. 41 July-August, 1941 No. 4

Texas Chytrids

John S. Karling

While chytridiaceous fungi appear to be almost universal in distribution, no species except *Physoderma maydis* and members of the genus *Synchytrium* have been reported from the southwestern part of the United States. It was accordingly with particular interest that the writer collected samples of water containing small amounts of vegetable debris during a visit to Texas in April, 1941, to determine the presence and relative abundance of these fungi in regions which are quite dry for the greater part of the year. Collections were made from ground tanks, water troughs, creeks, and roadside ditches in Bastrop and Travis counties in central Texas. These collecting grounds are normally dry during the summer and until late fall, but during April and May are usually well filled with rain water. The collected samples were baited with bleached, tender segments of young corn leaves, lens paper, and cellophane and brought to New York for intensive study. In the thirteen samples collected there was found a large number of saprophytic and parasitic chytrids, three of which appear to be new species. Two of these are particularly noteworthy, because they parasitize larger chytrids. In addition, another species was found which so far has never been reported for the New World.

Rozella Cladochytrii Karling (sp. nov.). Fungus parasiticus; sporangiis in matricis cella solitariis, sphaericis, 10-40μ, ovoideis, ellipsoideis, 10–15μ x 15–35μ, pyriformibus, obclavatis, hyalinis et levibus cum papillis exeuntibus numero una usque ad tres; pariete sporangii ex matrice plerumque non discernendo. Zoosporis e posteriore uniflagellatis, raro (protoplasmate irregulariter scisso) bi- et multiflagellatis, obclavatis, 3–3.5μ x 1.8–2μ, aguttulatis; flagello 14μ longo; zoosporis emergentibus maturis quasi flumine

ex papillis exeuntibus atque momenta intra nonnulla acriter moventibus. Sporis perdurantibus subflavis, ovalibus, sphaericis, 8–22μ, cum magna centrica gutta et cytoplasmate crasse granuloso; pariete 1–1.8μ crasso, levi aut spiculoso, spiculis 1.5–3μ longis praedito. Zoosporangiis directa germinatione sporae perdurantis factis, ut denique formentur zoosporae.

Parasitic in *Nowakowskiella profusum* Karling, causing slight to marked hypertrophy of the rhizomycelium, State Park Lake, Bastrop, Texas.

This parasite is ubiquitous in host range, because it may infect *N. elegans, N. ramosum, Cladochytrium replicatum, C. crassum,* and *C. hyalinum* under experimental conditions.

Rozella Endochytrii Karling (sp. nov.). Fungus parasiticus; sporangiis in matricis cella solitariis, sphaericis 15–500μ, ovalibus, elongatis, pyriformibus et irregularibus ex matricis cellae magnitudine formaque; pariete sporangii ex matrice plerumque non discernendo, hyalino et levi cum una aut compluribus papillis exeuntibus 2–6μ altis. Zoosporis e posteriore uniflagellatis, obclavatis, 3.4–4μ x 1.5μ, aguttulatis sed densiores regiones spicis radicisque ad oculos praestantibus quae propriae ut videtur, sunt; se in interioribus partibus sporangii torquentibus, pariete nondum dehiscente; postea emergentibus quasi flumine et nonnulla intra momenta acriter moventibus. Sporis perdurantibus incompertis.

Parasitic but not causing hypertrophy in sporangia of *Endochytrium operculatum* growing in oat leaves in a water trough on the Karling estate, Austin, Texas.

Entophylyctis Texana Karling (sp. nov.). Fungus saprophyticus; thallo intramatricali, monocentrico, eucarpico; sporangio globoso aurantiacis globulis praedito et rhizoideo systemate maxime ramoso extensoque subiacente. Zoosporangiis variis magnitudine formaque, subsphaericis, 18–45μ, pyriformibus, 10–22μ x 20–40μ, elongatis, truncatis, 15–25μ x 35–60μ, lobulatis et irregularibus; aliquando amplius quam unam matricis cellam permeantibus; tubulis exeuntibus una aut compluribus variis longitudine diametroque. Zoosporis sphaericis, 4–4.5μ, cum globulo conspicuo, aurantiaco et maxime refractivo, atque e posteriore flagello 20–24μ longo; emergentibus lente, primo massa globosa orificio tubulae

exeuntis manentibus, sed mox acriter moventibus. Rhizoideo systemate uno loco in radice sporangii plerumque oriente, crasso (primo axi 2–7μ diametro), maxime ramoso, 100–600μ longo. Spora perdurante aurantiaca aut auruginosa, plerumque sphaerica, 18–24μ, oblonga, 10–13μ x 15–18μ, elongata et truncata, 10–22μ cum magnis centricis globulis numero uno ad tres 8–15μ diametro atque strato parietali globorum minorum; pariete aeruginoso 1.5–2μ crasso, levi; spora perdurante per porum parietis in zoosporangium parietibus tenuissimis praeditum germinata.

Saprophytic in dead leaves of *Elodea canadense, Eriocaulon septangulare,* and *Vallisneria* sp. State Park Lake, Bastrop, Texas.

Because of its brilliant golden-red color, this is one of the most striking rhizidiacous species I have ever observed. Whether or not it is identical to the similarly-colored species, *E. aurantia,* described by Miss Domjan[1] in Hungary, however, is open to question. Her description and figures are meager, and the account of proliferating zoosporangia suggests the presence of *Cladochytrium replicatum* instead of a monocentric rhizidiacous chytrid. The zoospores of our species are smaller than those of *E. aurantia* and form a globular mass at the mouth of the exit tube instead of emerging singly and swimming directly away.

Another known chytrid of considerable interest discovered in the Texas collections is *Nowakowskiella ramosum.* This species was found by Butler[2] in 1907 in rotting wheat stems in India and has not been reported as such since that time. However, the resting spores of *N. endogena* described by Miss Domjan in leaves of *Typha* doubtless relate to this species. I found *N. ramosum* in rotting oat leaves in a water trough on the Karling estate near Austin, Texas, and have isolated it in pure culture on synthetic media. This species is particularly interesting because of the marked proliferation of cells in relation to resting spore formation, the appearance of which strongly suggests zygomycetous sexual reproduction. Resting spores were formed in great abundance in our material along with zoosporangia and germinated within 8 to 21 days. In germination they may function as a prosporangium and form a thin-walled zoosporangium on their surface or become transformed

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[1] 1935. Folio Crypt. 2: 26.

[2] Mem. Dept. Agric. India Bot. 1, no. 5.

directly into zoosporangia with an exit tube in the manner described by the author[3] for *N. profusum.*

In addition to the four species noted above, the following chytrids have been found in the Texas material:

Olpidium endogenum in pollen of *Pinus sylvestris.* State Park Lake, Bastrop, Texas.

Olpidium gregarum (?) in the bodies of rotifers. State Park Lake, Bastrop, Texas.

Rhizophidium pollinis on *P. sylvestris* pollen. State Park Lake, Bastrop, Texas.

Rhizophidium sp., and *R. chaetiferum,* saprophytic on dead internodes of *Chara coronata,* State Park Lake, Bastrop, Texas.

Rhizophidium globosum, parasitic on oogonia and male plants of *Oedogonium* sp., water trough on Karling estate, Austin, Texas.

Diplophlyctis intestina, Entophlyctis heliomorpha, Nephrochytrium appendiculatum, and *Endochytrium operculatum* in dead internodes of *C. coronata.* State Park Lake, Bastrop, Texas.

Rhizophlyctis petersenii, Catenochytridium carolineanum, Cladochytrium replicatum, C. crassum (Hillegas, in press), *C. hyalinum, Nowakowskiella profusum,* and *N. elegans* in rotting oat leaves in a water trough, Karling estate, Austin, Texas. In *C. replicatum* only about 10 percent of the resting spores were smooth; the remainder were covered with comparatively long tenuous setae. In germination the resting spores developed thin-walled evanescent zoosporangia on their surface, and no cases of direct transformation into zoosporangia with exit tubes were observed. The latter type of germination previously reported by the author[4, 5] appears to be exceptional.

It is also significant to note in this connection that *Lagenidium pygmeum* was found in great abundance in *Pinus sylvestris* pollen at Bastrop, Texas. This species has been reported but once previously in the New World.[6]

Botany Department,
Columbia University,
New York, N. Y.

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[3] 1941. Bull. Torrey Club **68**: 386.

[4] Amer. Jour. Bot. **22**: 450. 1933.

[5] Science, **79**: 390. 1934.

[6] J. S. Karling, 1941. Mycologia 33 (In Press).

Colutea arborescens in Rhode Island

W. H. Camp

Colutea arborescens L., a shrubby member of the Leguminosae with showy yellow flowers marked with red and inflated pods, and native in the Mediterranean region, has recently been reported growing in beach sand at Fields Point, Rhode Island, by Mr. Robert Marks. The shrub has been established for some years and, although battered, survived the recent hurricane. It is likely that this material has not escaped from cultivation here, but has been introduced in ballast or ship waste for, according to Mr. Marks, a ship-line plying between the Mediterranean and this country often tied up at Fields Point.

The species was recognized by Mr. E. J. Alexander from Mr. Marks' field notes and drawings.

New York Botanical Garden.

Viola conspersa in Louisiana

Lauretta E. Fox

Viola conspersa, Reichenb., the American dog violet, was found growing in ravines at Brezeale Springs, Grande Ecore and Sang-pour-Sang, Natchitoches Parish, Louisiana. This violet was in bloom April 5, 1941. Upon investigation this species will probably be found growing on all the geologically older soils of the northern part of the state. In the same habitat grow many species which were formerly considered to have a more northern range, as *Cypripedium pubescens* Willd., *Polygonatum biflorum* Ell., *Uvularia perfoliata* L., *Woodsia obtusa* Torr., *Viburnum densiflorum* Chapm., *Viburnum prunifolium* L. and *Erythronium americanum* Ker. These plants are able to live in the ravines where the temperature until late in the spring remains much below that of the drier ridges and slopes of the bluffs and hills.

Department of Biology,
Louisiana State Normal College,
Natchitoches, Louisiana.

A Three-leaved, Six-sepaled and Nine-petaled *Trillium grandiflorum*
In Ulke's rock-garden, at 300 feet elevation, in Washington, D. C. Photo by R. Lawrence. Collected May 25, 1940.

Reduction of the Floral Parts of a Multiple Trillium in Successive Years

Titus Ulke

In Torreya 38: 125, 1938, appeared a somewhat distorted story and inaccurate description by Ruhoff of a *quintuple* or fifteen-petaled *Trillium grandiflorum,* two specimens of which, growing near each other, were almost simultaneously discovered by him and the writer on Old Rag Mountain, Va., on May 6, 1938.

The elevation of the locality was approximately 3,000 feet, not 2,500, as stated by Ruhoff, both specimens possessed three leaves, not nine as given in said description, and they were not collected on May 1. On the way down the mountain the rootstocks of both specimens became detached, but fortunately were not lost.

The rootstock of my plant was transplanted, with some of its granitic soil, to my rock-garden at the John Dickson Home, Washington, D. C., on May 6, 1938. It did not produce a flower in 1939, but fortunately shot up in 1940, in the middle of May, as a *triplicate* or nine-petaled *Trilium grandiflorum,* shown in the illustration. It was presented to the U. S. National Herbarium, minus the rootstock, which is still in my garden, and given the number 1786868.

The plant has a yellowish green stem, about 20 cm. high, three light green, rhombic ovate leaves averaging 8 cm. in length, and 4.5 to 4.8 cm. in greatest width, and a reddish brown peduncle 4 cm. long, terminated by the floral whorl 5 cm. in diameter. The distance from the top of the ascending rhizome to the whorl of leaves is 14.6 cm. There are six green, lanceolate sepals, the average length of the outer of which is 2.8 cm., while the inner sepals measure 2.5 cm. The petals, nine in number, and rose pink in color, are in three whorls, and their average length is as follows: outer petals, 2.2 cm., intermediate 1.6 cm., and the inner petals 1 cm.

The present habitat in granitic soil, its moisture condition, shade, and plant associations are somewhat like those of its mountain occurrence, the chief difference being the altitude, *i.e.,* 300 as against 3,000 feet above sea. It would seem that the transplantation to the new environment has brought about the dwarfing of the plant by a third of its length, *i.e.,* its decrease from 30 cm. height

to 20 cm., and the reduction of the number of petals from fifteen to nine in the bloom which came two years later from the same rootstock.

New and Noteworthy Northwestern Plants—Part 9, Notes on North American Thermopsis

Harold St. John

Thermopsis montana Nutt. var. ***ovata*** (B. L. Robinson) St. John, comb. nov.

T. montana ovata subsp. B. L. Robinson ex Piper, U. S. Nat. Herb., Contrib. 11: 349–350, 1906.

T. xylorhiza A. Nelson, Bot. Gaz. 52: 265–266, 1911.

T. ovata (Robins.) Rydberg, Torrey Bot. Club, Bull. 40: 43, 1913.

The writer has once previously studied the stout *Thermopsis* with broad elliptic leaflets growing in Idaho and Washington, and has published the conclusion that there was only one species present, *T. montana,* and that the subsp. *ovata* was a synonym of the species (St. John, Fl. S. E. Wash. 233–234, 1937).

M. M. Larisey has recently published a revision of the North American species of *Thermopsis* (Mo. Bot. Gard., Ann. 27: 245–258, 1940). She accepts both *montana* and *ovata* as species, keys them and describes them. She accepts as valid *T. ovata* (Robins.) Rydb. (1913) while listing as its synonym *T. xylorrhiza* A. Nels. (1911). This name of Nelson's, which should be spelled as it was in the original publication, *T. xylorhiza,* was the first one published in the category. Hence, this name should be adopted if the plant is accepted as a species. When studying the problem at Pullman, Wash., the writer had available abundant collections from the Pacific Northwest, including an isotype of *T. montana* subsp. *ovata.* Now, at the Gray Herbarium, he has similar collections, the type of the subspecies, as well as large collections of *T. montana* Nutt. from the Rocky Mountains and the Nuttall type specimen. An isotype specimen of *T. xylorhiza* is also available. It is now evident that the true *T. montana* Nutt. of the central and eastern Rocky

Mountains is a plant with narrow leaflets, different from anything in the Pacific Northwest. Rydberg maintained three species in this group (Fl. Rocky Mts. 456, 1917), *T. montana, T. ovata,* and *T. xylorrhiza* (= *T. xylorhiza*). When Rydberg made the specific combination, *T. ovata* (Torrey Bot. Club, Bull. 40: 43, 1913), besides the evident broader leaflets and stipules, separating *ovata* from *montana,* he alleged that it differed also in having its leaves spreading, the lower leaves (= leaflets) very oblique, and in its elongate, lax raceme. It was said to differer from *T. xylorhiza* in its lax inflorescence and strictly straight pods. These characters have been checked, and the writer finds no differences in the posture of the leaves, the obliqueness of the lower leaflets, the length and laxity of the inflorescence, and the straightness of the pods. Frankly, these alleged characters seem imaginary. Later, Rydberg (Fl. Rocky Mts. 456–457, 1917) described differences in the length of the flowers. The writer finds no such differences.

Larisey (p. 247) keys *T. ovata* as having leaflets obovate to broadly elliptic, and *T. montana* as having leaflets linear. Thus stated, the characters are strongly contrasting. Checking these against the specimens, it is obvious that *ovata* has the leaflets very much as described, that is from elliptic to oblanceolate or obovate. On the other hand, *montana* has the leaflets from narrowly elliptic to narrowly oblanceolate. In the original description Nuttall ex Torrey and Gray said "leaflets lanceolate, narrowed at the base," which is exactly our modern term oblanceolate. In her description (p. 253) Larisey says "leaflets linear to linear-lanceolate," while in the key (p. 247) she distinguishes the plant solely by "Leaflets linear." Quibbling over the exact meaning and application of descriptive morphological terms is usually unprofitable, but if any such term is clearly defined and identical in use, it is the term linear. The illustrations are similar and the definitions of it are exact equivalents in Lindley's Introduction to Botany and in Gray's Lessons in Botany. Linear is a narrow shape with the sides parallel. Neither the old Nuttall type specimen nor any of the abundant recent collections show any linear leaflets. This point has been discussed in detail, because any student who cannot verify the type specimens will be misled by Larisey's key.

Now, consider the taxonomic status of *T. ovata.* As defined and characterized by its broader leaflets and stipules, it seems at first

glance well separated. It occurs in Washington, Oregon, and Idaho. *T. montana,* with its narrow and seemingly more erect leaflets and stipules also has a recognizable aspect. It occurs from Idaho and Montana to Colorado and Utah. The two ranges touch each other. There are, however, specimens with the leaflet and stipule shape and size intermediate between the two groups. Such ones are Oregon, E. Hall 83; Idaho, Lolo Trail, Watson 76; Idaho, Falks Store, Macbride 800 and 99. The last specimen is the type of *T. xylorhiza.* The existence of these intermediates breaks down, it seems, any specific lines. Aside from breadth of leaflet and stipule, there are no other characters. The ranges are largely distinct, but they touch. Hence, the two plants seem most truly classified as a species and a variety.

Thermopsis pinetorum Greene in its original description was said to have "pods . . . pubescent or strigulose". Larisey (p. 252) cites the specimen, Arizona, Chiricahua Mts., Blumer 1590. This is in fruit. The pods are densely villous, except where the exocarp has been worn off. Larisey keys this species (p. 245) under, "Pods glabrate" and so describes it. Her treatment seems at variance with the fruiting material seen and the original description.

On page 252 Larisey publishes the name *Thermopsis pauciflora* Thornber ined. In the first place she does it in synonomy, which makes the name invalid. In the second place the printing of such rejected manuscript names causes a cluttering up of nomenclature. This practice is directly interdicted by the International Botanical Rules (Rec. XXII, Cambridge, 1935).

Baptisia mollis (Michx.) Nutt., Gen. N. Am. Pl. 1: 281, 1818, was not republished as new by De Candolle (Prodr. 2: 100, 1825) who merely included Nuttall's species, attributed it to him, and gave the reference. Larisey (p. 248) lists this non-existent *B. mollis* (Michx.) DC. as a synonym of *Thermopsis mollis* (Michx.) M. A. Curt., while lower down on the same page she lists *B. mollis* (Michx.) Nutt. which is based on the same name-bringing synonym *Podalyria mollis* Michx., as a synonym of *T. fraxinifolia* (Nutt.) M. A. Curt. It is obvious that *B. mollis* cannot be a synonym of *T. fraxinifolia* as it is the ultimate basis of *T. mollis.*

Thermopsis fabacea (Pall.) DC., Prodr. 2:99, 1825.

Sophora fabacea Pall., Sp. Astragal. 122–123, t. 90, fig. 2, 1800.

T. fabacea (Pall.) DC. was listed by Torrey as the name for This was a misidentification, and there is no indication that the certain Californian collections (Bot. Mex. Boundary 58, 1859). binomial was being published as a combination by DC. ex Torr., as stated by Larisey (p. 255). The Asiatic *T. fabacea* resembles *T. montana* var. *ovata,* but is certainly a different species because it has the legumes longer stipitate with the stipes often exserted, the calyx silky villous, and the leaflets larger and broader.

T. fabacea (Pall.) DC. is restricted to northeastern Asia, *i.e.,* from Kamtchatka, the Kurile Islands, and south to the Liu Kiu Islands and Fukien (fide Hultén, Fl. Kamtchatka, 3:93–95, 1929).

If *T. fabacea* (Pall.) DC. ex Hooker (Fl. Bor.-Am. 1:128, 1838) is really, as cited by Larisey (p. 253), a synonym of *T. montana* Nutt. (1840), it would have to be adopted as the earliest name. However, Hooker's treatment was actually printed in 1830 (not 1838), but *T. fabacea* was not there published as new. Hooker credited it to the real author of the combination, De Candolle. Hooker's use of the name was only a misidentification of the plant of northwestern North America with the one of northeastern Asia, and he should not be credited with making a synonym. Hence, *T. montana* Nutt. and its var. *ovata* (B. L. Robins.) St. John should be accepted as the correct names for the related American plants.

University of Hawaii,
Honolulu, Hawaiian Islands.

Does Ficinia filiformis Still Live in Jersey City?

Charles Gilly

Recent examination of a specimen collected by the late Judge Addison Brown, September 20, 1880, "from ballast, near Communipaw Ferry, N. J." (the present Liberty Street ferry-landing and terminal of the Central Railroad of New Jersey, in Jersey City), shows it to be *Ficinia filiformis* Schrad., a native of the Cape

region of South Africa, and a member of the Cyperaceae in a genus previously unreported for North America.

Ficinia filiformis has cespitosely clustered, filiform culms 10–25 cm. tall; the leaves are all basal with prominent scarious sheaths and filiform blades 2–8 cm. long. The terminal capitate inflorescence, of 2–5 reddish spikelets about 3 mm. long, is subtended by two involucral bracts, the lowermost 1–2 cm. long and appearing to be a continuation of the culm. *Ficinia filiformis* superficially resembles *Scirpus Clintoni* and *S. Hallii;* it might also be mistaken for a depauperate form of the more common *Bulbostylis capillaris.*

It is hoped that, during the coming field season, members of the Torrey Botanical Club will search for this plant near the C. R. R. N. J. terminal and in other waste places in the New York harbor area where the species might still be persistent. It is requested that all suspicious looking specimens from the region be forwarded to the writer for determination.

New York Botanical Garden.

Lespedeza violacea in New Jersey

Harold N. Moldenke

In the first report of the Local Flora Committee in Torreya 40: 105–109 (1940) the statement is made that *Lespedeza violacea* (L.) Pers. is "represented in New Jersey from Warren, Morris, and Bergen Counties." The implication is that it is not known as yet from any other counties. Actually there are specimens of this species in the Britton Herbarium at the New York Botanical Garden from two additional counties. N. L. Britton collected it at Sparta, Sussex Co., on September 5, 1887, and K. K. Mackenzie's No. 1123 is from Wight's Pond, Sussex Co., collected on September 25, 1904. The present writer's No. 11243 was collected along an old wood road on the "First Mountain," Watchung, Somerset Co., on August 23, 1939.

It is to be hoped that the Local Flora Committee will some day publish a series of maps showing the known distribution of all the species and varieties of wild plants in the so-called "Torrey Club range" (*i.e.,* within a radius of 100 miles from New York City).

Such maps could be of the sort recently published by Frank Gates in his "Flora of Kansas" and by Charles Deam in his "Flora of Indiana." They should be compiled on the basis of all the preserved material in all the important private and institutional herbaria in this area, and not merely on the basis of the material in one or a very few herbaria. Such a series of maps would show graphically where members of the Club could profitably botanize. The reward of being able to extend the known distribution of a species or variety in one direction or another in our area ought to provide a sufficient incentive to much worthwhile botanizing and collecting in a region which is fast being changed by the rapid advance of civilization.

New York Botanical Garden.

BOOK REVIEWS

One More Textbook

Textbook of Botany. E. N. Transeau, H. C. Sampson and L. H. Tiffany, Harper & Brothers. 1940. $4.00.

The first botany presented to beginners and the general public was taxonomic; later it became morphology, especially the comparative morphology of a series of types interpreted by a theory of descent. Recently an attempt has been made to teach a more "biological" botany, to emphasize the functions of plants as a means of formulating a concept of life. Still more recently ecology has won recognition as a teachable point of view and botany has become the study of vegetation and its relations with animal life and human civilization.

The *Textbook of Botany* by Transeau, Sampson, and Tiffany (though it opens in the good old-fashioned way with a description of a bean seedling) represents, more competently than any other recent text, the most modern approach to "general" botany. This latest arrival in the family of botanical texts is a big book of 812 pages, with 424 illustrations, several in color. There are fifty-three chapters, beginning with "Plant Science," "The Parts of Plants," "Learning to Name Plants," "Seasonal Aspects of Plants," and continuing with "The Tissue Systems of Leaves," "A Bit of Useful

Chemistry," the manufacture and use of food, the relations of plants with water, the tissues and processes of stems and roots, reproduction and heredity in flowering plants, to descriptions of algae, fungi, and other plant groups, and the final chapters on "Plants of the Past" and "The Vegetation of North America." The book is beautifully printed, the illustrations well chosen and well reproduced, and the text interestingly and clearly written. Even the English is good—for botanists.

The arrangement of topics is evidently designed to fit a particular course. The early chapters are written with a view to outdoor work by beginning students, and consequently seem to the general reader somewhat desultory and disjointed. But with Chapter VII we begin to reach the meat of the subject. And it is rich fare, lacking neither in variety nor in nutritive qualities. A student who digests the bulk of this volume will know more botany than some young instructors. Such topics as the condensation and digestion of carbohydrates and the synthesis of fats and proteins are treated in far greater detail than in other general textbooks. Some idea of the bias of the book may be obtained from the titles of the chapters devoted to flowers: Chapter XXXI, "Initiation of Flowers" (18 p.); Chapter XXXII, "Flowers, Fruits, and Seeds" (20 p.); Chapter XXXIII, "Sexual Reproduction in Flowers" (16 p.); and Chapter XXIV, "Growth, Dormancy, and Germination of Seeds" (13 p.). Physiology here wins parity with the morphological detail long considered essential in a scholarly text. The only criticism of such a treatment is that it has been perhaps carried too far. The wealth of chemical detail particularly seems to this reviewer rather strong meat for the average college freshman.

One of the best features of the book is the frequent introduction of actual data, which initiates the reader thoroughly into scientific method and should impress him with the nature of scientific conclusions as contrasted with purely authoritarian statement. Useful references for further reading are found at the ends of many chapters, mostly to texts and reviews, but many to original researches. Many subjects are treated with a wealth of tabular and numerical detail which should impress and interest students. On page 122, for instance, we learn that an elm tree may have 250,000,000 chloroplasts to every square inch of leaf surface, and sixteen acres of total chloroplast surface. On page 313 is a

table showing the total surface of the 2,000,000 feet of roots and 6,000 miles of root hairs of a single grass. There are many such tables.

The development of physiology has been at the expense of taxonomy, morphology, and even genetics. Chapter III, "Learning How to Name Plants," really is concerned with the terminology of leaves, and contains scant reference to the naming of plants. There is nowhere in the book any attempt to present a scheme of classification of the plant world or to explain the principles on which such a scheme might be based. The comparative morphology of the various groups, *i.e.,* what used to be called a survey of the plant kingdom, occupies only about a fifth of the book, and the descriptions of the so-called lower groups are scamped to a degree which will disappoint many teachers and even some students. A book of this size might be expected at least to serve as a reference work for a certain amount of morphological detail. In short, while the reviewer has long advocated a trend in this direction, he feels that this book has over-shot the mark. The treatment of genetics seems at the same time over-simplified and involved. Meiosis is represented as involving merely the pairing and disjunction of homologous chromosomes ("the chromosomes do not 'split' "). Crossing-over is mentioned only incidentally in the following confused statement: "A third type of irregularity has been variously called 'translocation,' 'segmental interchange,' and 'crossing-over.' "

The wider the scope of a general text, the more certainly will there be errors. In this book a few are evident. Perhaps the worst is the statement on page 402 that "embryos develop from vegetative cells in the notches of the leaves of bryophyllum." On page 55 a distinction should be made between light (which does not increase the rate of evaporation) and the heat due to absorption of light (which does). On page 202 we are led to believe that the solution of sugar in water will always cause an increase in volume of the liquid. On page 527 Franz Schulze is referred to as "Schultze." On page 582 *Plasmodiophora Brassicae* is described as "a simple mold." Inflorescences, so commonly confused by modern botanists, are more than usually so on pages 360 and 361, where an attempt is made to classify them without reference to the order of flowering, and the milkweed acquires an umbel in consequence. Figure 45 is wrongly oriented.

A few peculiarities of terminology seem unnecessary. The reasoning that substitutes "ovulary" for ovary should also lead to the introduction of new terms for egg, sperm, micropyle, epidermis, respiration, and many others. And there seems no reason at all why the familiar and inoffensive "haploid" should be replaced by such an etymological waif as "monoploid."

It is always a pleasure to read a textbook which does not stultify itself with the Spencerian teleology which has so long dominated the teaching of biology. However, the philosophy which expels teleology must be more rigorous than that which let it creep in. It is not sufficient to refer to the lack of consciousness in plants; automobiles and watches have purposes, and perhaps even in more than one sense. If the scientific approach merits discussion, the intelligent student has a right to a better treatment than that of Chaper VI. The biologist, instead of attemping to show the absurdity of teleology (which is not absurd), should devote his efforts to demonstrating its uselessness in science and the usefulness of the mechanistic view.

Errors and defects are inevitable in any large work and need not interfere seriously with its use; the experienced teacher will be able to detect them and to make allowance for them. It may safely be said that this is the best textbook of botany and the most significant contribution to the teaching of the subject that has appeared in several years, and should be of great value to teachers who have students and assistants capable of handling so detailed a presentation and who sympathize with its definition of what should be taught in an elementary course.

H. W. Rickett

New York Botanical Garden.

Plants and Man

Plants and Man. Clarence J. Hylander and Oran B. Stanley. X+518 pages. Blakiston Co. 1941. $3.00.

Quite different from the usual textbook is this one prepared for a one semester course in Junior Colleges and Teacher Training Colleges. It is planned primarily as a cultural course for those who may take no further work in botany, appealing to the interest of students by stressing man's dependence on plants. Chiefly a text on economic botany, it discusses in addition the structures and

functions of plants to give a good basis for understanding useful plant products. The last section—The Enjoyment of Plants—is on the order of what is commonly called nature study and forms a fitting conclusion to the book.

Part one—The Nature of The Plant World—and the chapters in parts two and three on the manufacture of food and on the plant skeleton—comprising nearly one-third of the book, is much the same material, in a simplified form, found in the standard botany texts. Such subjects as protoplasm, cells, types of plants, leaf and stem structure, photosynthesis and classification are discussed. In the chapter on Evolution of Plant Reproduction the discussion of alternation of generation is adequate, while the diagrams showing the life histories of moss, fern, pine and apple tree are excellent. Adaptations for wind and insect pollination are given in a concise but satisfactory manner. The chapter on the origin of cultivated plants has a little on plant breeding, including hybridizing, but with no mention of genes nor of Mendel.

Part two describes most of the food plants of the world under the heads of vegetable foods, cereals, legumes, berries, orchard fruits, sugars, food accessories and beverage plants. Part three on wood, forestry and fiber plants, gives in addition to descriptions of wood and its uses, lumbering, forestry and forest conservation, brief descriptions of nearly all the trees used for lumber in the United States. In addition to the fiber producing plants there is an account of artificial fibers, such as rayon, and their manufacture. Part four considers latex producing plants and drug plants. Tobacco being considered a drug plant, as is correct, though possibly not in accord with the common idea.

Plants harmful to man takes up bacteria and the diseases they cause both to man and cultivated plants, also fungi and plant diseases. This completes the part of the book dealing with the economic uses and harms of plants.

The last chapters are on wild flowers and ornamental plants. "To know a few of the common plant neighbors, ... to understand their distribution and origin—all make for a fuller and richer life." The characters of twenty of the larger plant families are given with descriptions of common flowers of each. As flowers from all parts of the country are described and illustrated, the book will be as interesting to students from the far west as from the

east, from the prairie states as well as from the mountains. It is to be regretted that the characteristics of the families are so brief as to give the student little idea of what the families really are. All that is said as to the characters of the Buttercup Family is that it contains "flowers with separate sepals and petals, often in an indefinite number" and of the Mallow Family that the flowers have "five partly-fused sepals and five large petals." The chapter on ornamental plants gives a surprising amount of information in less than twenty pages.

The book is illustrated with over three hundred figures—some half tones, most line drawings—usually two to six of the latter grouped in one figure. The half tones are most of them poorly reproduced, lacking in detail and pleasing qualities. The drawings, except for the maps and diagrams, are crude, in a few cases inaccurate, and fail to give an idea of the plants illustrated.

The manner of treatment of the various topics makes the book one that can be read with interest by anyone and it should appeal to the average student. Used by a teacher enthusiastic for this type of plant study it will help to create a lasting interest in the plants used or enjoyed by everyone. Enough is given of structure and function to enable students to go on into courses in morphology, physiology and taxonomy. In general the book is well adapted to do what the authors planned—"appeal to the cultural interests of the general student, acting as a survey of plant science and building at the same time a substantial foundation for further botanical study." And, in addition, it will be of value as a reference work on economic plants.

George T. Hastings

Nature Lore Books

The American Book of the Woods, $2.00, and Learn the Trees from Leaf Prints, $1.00, Davis S. Marx. The Botanic Publishing Co., Cincinnati, 1940.

The American Book of the Woods was designed primarily for use in camp activities and school projects, but its appeal is not confined to these groups. Any nature studying groups, such as Girl or Boy Scouts, would find this book full of very usable information. It is divided into three major parts, Utility Materials, Foods and Beverages, and Poisonous or Medicinal Plants.

The Utility Materials division includes Fire Lore, Water Lore, Basketry and Binding, Stains and Dyes, and many other things. The Foods and Beverages division gives information on edible roots, pot-herbs, edible seeds, nuts, fruits, berries, etc. Division III tells the plants used medicinally for first aid, for astringents, as well as those which are noxious or poisonous.

The correlation of plants and trees with their uses and the accurate leaf plates make this a most interesting and useful volume for all nature group leaders.

"Learn the Trees from Leaf Prints" was designed as a supplement to personal guidance and as an encouragement where technical knowledge is hard to obtain or too tedious to make tree study a pleasure. About 195 leaf prints are included. They give an accurate portrayal of the leaves. They indicate the typical leaf of the kind of tree from which they were taken. They show the average length of stem, the lobing or indentations, the venations, and sometimes even the texture of the leaf. This is the fun way to acquaint yourself with the trees.

Margaret O. Bonisteel

PROCEEDINGS OF THE CLUB

Minutes of the Meeting on February 4, 1941

The meeting was called to order at the American Museum of Natural History by the President, Dr. John S. Karling, at 8:15 P.M.

Fifty-two members and guests were present.

The minutes of the previous meeting were approved as read.

It was voted that the Secretary admit the following by unanimous ballot to membership in the Club: As annual members: Mrs. Roy A. Hunt, 4875 Ellsworth Ave., Pittsburgh, Pa.; Dr. Ernst C. Abbe, Dept. Botany, Univ. Minnesota, Minneapolis, Minn.; Mr. Willy Ley, 304 W. 24th St., New York, N. Y.; Dr. Angel L. Cabrera, Museo de La Plata, Argentina; Miss Lena Bondurant Henderson, Randolph-Macon Woman's College, Lynchburg, Va.; Dr. F. C. Hoehne, Rua Theodoro Sampaio, no. 632, Sao Paulo, Brazil; Rev. Dr. Theodore C. Petersen, St. Paul's College, Brookland, Washington, D. C.; Dr. Clifton C. Doak, Box B—F. E., A. & M. College of Texas, College Station, Tex.;

Mr. Don E. Eyles, Box 547, Savannah, Ga.; Miss Margaret Kemp, Smith College, Northampton, Mass.; Miss Leonora H. Pugh, 163 Madison Ave., Elizabeth, N. J.; Dr. Walter Conrad Muenscher, 1001 Highland Rd., Ithaca, N. Y.; Dr. G. Steiner, Bureau of Plant Industry, U. S. D. A., Washington, D. C.; Dr. Margaret Fulford, Dept. Botany, Univ. Cincinnati, Cincinnati, Ohio; and Miss Ethel Welti, Box 924, New Jersey College, New Brunswick, N. J. As associate members: Mr. Alberto M. Brenes, San Ramon, Costa Rica; Mrs. R. A. Wetzel, 218 Tecumseh Ave., Mount Vernon, N. Y.; Miss Ethel M. Gray, 180 Whitney Ave., Pompton Lakes, N. J.; Mr. James M. Labaugh, 80 Haledon Ave., Paterson, N. J.; Miss Dorothy Moody Brown, 419 W. 114th St., New York, N. Y.; Mrs. John W. Radu, 319 E. 17th St., New York, N. Y.; and Mrs. Charles H. Drews, 15 Brainerd St., Upper Montclair, N. J. By transfer of membership from annual to associate: Miss Viola Richtberg, 2305 Andrews Ave., Bronx, N. Y.; and Dr. Leon Hervey, 2121 Grand Concourse, Bronx, N. Y. By transfer of membership from associate to annual: Mrs. Leon Hervey, 2121 Grand Concourse, Bronx, N. Y.

The resignations of Mrs. Kathleen Goddard Shirazi, c/o Parvaz, 34 E. 64th St., New York, N. Y., and Miss Grace Kelly, 539 W. 156th St., New York, N. Y., from associate membership; and Mr. Paul F. Frese, 70 E. 45th St., New York, N. Y.; Miss Beatrice Scally, 244 Glenwood Ave., East Orange, N. J.; Mrs. Cecil Yampolski, 230 Franklin Ave., Grantwood, N. J.; Mr. George Schwartz, 8447 118th St., Richmond Hill, S. I., N. Y.; Dr. Kenneth B. Raper, U. S. D. A., Northern Regional Research Lab., Peoria, Ill.; Mr. Frederick J. Hermann, Division of Plant Exploration and Introduction, Bureau of Plant Industry, U. S. D. A., Washington, D. C.; and Dr. Norwood C. Thornton, Boyce Thompson Institute, 1086 N. Broadway, Yonkers, N. Y., from annual membership were accepted with regret.

With deep regret Dr. Moldenke announced the death of Mr. A. D. Kalmykov, associate member of the Club since 1939; and Miss Zaida Nicholson, member of the Club from 1923 to 1938. Dr. Moldenke read the following brief obituaries:

It is with deep and genuine regret and sorrow that I announce to the Club the death of two of our very respected friends and members, who will be greatly missed.

The first death which I must report is that of Miss Zaida Nicholson, who was an annual member of the Club from 1923 to 1938. Miss Nicholson was one of our most enthusiastic and faithful field members, in spite of her advanced age. A graduate of Packer Collegiate Institute in Brooklyn and for some time a resident of Paris, France, she was greatly interested also in the theater. In her youth she saw the great Booth act and practically every great actor since that time. During her latter years it became increasingly difficult for her to maintain the pace that most leaders of field trips required. But this never discouraged her. Although she invariably fell behind the group, often to a considerable distance, this never diminished her enthusiasm. Three times she fell on Torrey Club trips and broke a limb, but not even this could discourage her. Some of the more thoughtless leaders sometimes felt a bit annoyed at her persistence, but I feel sure that I speak for them as well as for all the field members of the Club when I say that we are all greatly saddened at the thought of her death. In the summer of 1939 she underwent a serious operation in St. Luke's Hospital here in the city; miraculously, in spite of her very advanced age, pulled through and only last year told us that she hoped to be able to come out on Torrey Club trips again soon. Last September she died very suddenly from the effects of a cerebral hemorrhage. We are all saddened to think that we shall not see Zaida Nicholson any more on our trips, but I know that she will be there with us, probably on every trip, and now she will once again be able to keep up with the leader at all times.

The second death which I must report is that of Mr. Andrew D. Kalmykov, an associate member of the Club since 1939. Mr. Kalmykov was a former diplomat of Imperial Russia and died at his home here in the city last week, after a short illness, at the age of seventy. As secretary of the Russian legation at Bangkok in 1898 he mediated a dispute between the Siamese and French Indo-China governments. A frontier settlement which he suggested lasted until recent months and he was instrumental in the defense of Thailand. In 1912 when a defeated Turkish army evacuated Uskub in Turkish Macedonia during the first Balkan war, Mr. Kalmykov took charge of the city for three days and prevented the massacre of the Christian population by enraged Moslems. For his work there the French Government made him a member of the Legion of Honor. During the first World War he was observer in the Dardanelles for his government. He came to America in 1923. He was a distinguished student of foreign affairs and orientalism and published a number of papers in these fields. He was an enthusiastic student also of Nature, both plants and animals, and it was always a great honor and pleasure to have him on our field trips. He will be greatly missed by us all.

It was moved by Dr. Moldenke, seconded by Dr. Graves, and voted by the Club that the Recording Secretary be instructed to draw up letters of sympathy to be sent to the surviving members of the families of Miss Nicholson and Mr. Kalmykov on the behalf of the Club.

The President announced that due to a tied vote during the last election for a vacancy on the council, another ballot was necessary. The council had nominated R. P. Wodehouse, James Murphy and Clyde Chandler. Ballots were distributed and collected for counting.

The President announced that the appointment of the standing committee for 1941 had been approved by the council and that the lists of committee members would appear in TORREYA. He added that the chairman of the entertainment committee would accept donations for the entertainment fund.

Dr. Fred Seaver of the New York Botanical Garden gave a lecture in the scientific part of the program on "A Mycologist in Bermuda." Dr. Seaver stated that the Kodachrome pictures which he showed were his first attempts with that film; but he had a remarkably beautiful series of scenes of Bermuda and life on Bermuda. The most conspicuous blossoms were the Bouganvillea and the Hibiscus. Dr. Seaver also had photographs of the endemic *Sabal Bermudiana* and *Juniperus Bermudiana.*

Because the votes cast had resulted in a tie between Mr. Murphy and Dr. Chandler, a third set of ballots was distributed. On the third ballot Dr. Chandler was declared elected to the vacancy on the council. The meeting was adjourned at 9:45 P.M.

Respectfully submitted,

JOHN W. THOMSON, JR.

MINUTES OF THE MEETING ON FEBRUARY 19, 1941

The meeting was called to order at 3:35 P.M. at the New York Botanical Garden by the President, Dr. J. S. Karling. Twenty-five members and guests of the Club were present.

The minutes of the previous meeting were approved with correction.

Dr. Robbins moved, Dr. Bold seconded the motion and the Club voted that the Secretary admit the following by unanimous ballot to membership in the Club: As annual members: Dr. Samuel Hoffman Derickson, Lebanon Valley College, Annville, Pa.; Miss Hilda E. Aboy Buso, University of Puerto Rico, Rio Piedras, Puerto Rico; Mr. Clifford H. Meredith, Glenleigh Laboratory, Highgate, Jamaica, West Indies; and Miss Frances Fenton, Tar

Rock Rd., Saugatuck, Conn. As associate member: Mrs. Leon A. Hausman, 259 Harrison Ave., New Brunswick, N. J.

The transfer of Miss Alexandria Kalmykov from associate to annual membership was approved.

The resignations of Mr. Harry Sverdlick, 144–32 Liberty Ave., Jamaica, N. Y.; Miss Ruth V. Schmidt, 2929 N. Prospect Ave., Milwaukee, Wis.; Mr. Walter Jones, Plant Pathology Laboratory, Saanichton, B. C., Canada; Dr. Forman T. McLean, Oneco, Fla.; Miss Natalie Hettger, 214 Division Ave., Hasbrouck Heights, N. J.; and Dr. Clifford Leonard, Burlington, Vt., from annual membership were accepted with regret.

The report of Dr. Graves, chairman of the auditing committee, stating that the books of the Treasurer had been examined and found in order by the committee, was read by the President. Dr. Dodge moved the report be accepted and that a very brief statement of the financial standing of the Club be submitted by the Treasurer for publication in TORREYA. Dr. Camp seconded the motion and the Club so voted.

The scientific part of the program consisted of two lectures on the results of research. The first by Mr. Thomas Laskaris of the New York Botanical Garden was on the "Delphinium Crown Rot Complex." The speaker's abstract follows:

The most destructive disease of perennial delphiniums is crown rot or "black rot." The term crown rot as used here refers to a symptom complex of which the death and decay of the crown and roots, and the wilting, yellowing or general blight of the aerial parts of the plants are conspicuous features.

Crown rot may result from one of several causes which may be grouped into: (1) cultural defects and (2) parasitic fungi and bacteria. The relation of cultural defects such as faulty drainage, soil deficiencies, over-feeding, too warm an exposure, etc., to the incidence of delphinium crown rot is well known. Familiar also, as parasitic causes of delphinium crown rot, are the widely parasitic fungi, *Sclerotium delphinii,* and its related form *S. rolfsii,* the fungus *Rhizoctonia solani* and a bacterium of the common soft-rot group.

A recent study made by the speaker under the sponsorship of the American Delphinium Society and carried on at the New York Botanical Garden, has shown that several other fungi are important causes of delphinium crown rot. Most prevalent of these is a species of *Diplodina,* a pycnidial fungus previously unrecorded on delphinium. This fungus, in addition to crown rot has been found capable of producing a stem canker, local necrosis and leaf spot. Important also are two little-known delphinium diseases, *Fusarium* stem canker and *Fusarium* wilt. The present study is the first to definitely establish the causal relationship of *Fusarium* to these diseases. It is indicated

further that the same *Fusarium* species (to be described as a new form of *Fusarium oxysporum*) is capable of producing both the stem canker and wilt diseases, a relationship previously unsuspected. Considerable crown, root and stem rot of greenhouse and field-grown plants was caused by *Pythium ultimum,* a new disease of perennial delphiniums. Data have been obtained which make possible a better evaluation of the importance of the fungi and bacteria involved in the delphinium crown rot complex.

The second lecture by Dr. R. H. Burris, National Research Council Fellow in the Department of Botany, Columbia University, was on "Isotopic Tracers in Biology." The speaker's abstract follows:

The use of radioactive elements and stable isotopes as tracers has been readily accepted as a promising new approach in the study of biological processes. The general principles of tracing compounds by the incorporation of radioactive atoms or stable atoms of "abnormal" mass, and the determination of radioactivity by the Geiger counter and mass distribution by the mass spectrometer were discussed.

The stable isotopes of C, N, O, H and S have been concentrated sufficiently for use as tracers. Among the radioactive isotopes P, Na, K, As, Fe, Cu and S, have proved especially useful. The short half lives of radioactive C and N limit their applicability.

Illustrative examples of the application of the stable N^{15} isotope to problems in biological nitrogen fixation were cited, and the manner of checking for non-specific exchange reactions was outlined.

The meeting was adjourned at 4:40 P.M. to enjoy the tea served by the entertainment committee.

Respectfully submitted,

John W. Thomson, Jr.
Recording Secretary

Minutes of the Meeting on March 4, 1941

The meeting was called to order at 8:15 P.M. at the American Museum of Natural History by the President, Dr. J. S. Karling. Eighty-six members and guests of the Club were present.

The minutes of the previous meeting were approved as read.

Dr. Bold moved, Dr. Bonisteel seconded the motion and the Club voted that the following be admitted by unanimous ballot to membership in the Club: as annual members, Mrs. Wanda K. Farr, American Cyanamid Co., Stamford, Conn.; as associate member, Mrs. Fitz-Henry Paine, Breeze Hill, Abington, Conn.

The resignation of Miss Margaret A. Griffin, 131 Erie Ave., Midland Park, N. J., and Dr. Raymond H. Wallace, Connecticut Agricultural College, Storrs, Conn., were accepted with regret.

Dr. Bold read a letter from Mr. Schuyler Miller of the New York Trails Conference stating that a bill was before the New York State Legislature to permit the construction of a ski trail 80 feet in width and 20 miles long on Whiteface Mountain in the Adirondacks Dr. Bold moved that the following resolution be adopted by the Club:

Be it resolved that the Torrey Botanical Club heartily approves the action of the New York Trails Conference under date of August 18, 1940, in registering the unanimous disapproval of its membership concerning the proposed amendment to Section one, Article fourteen of the New York State Constitution. This amendment (at present pending as Assembly Bill 30 and Senate Bill 25), if adopted would permit the construction of ski trails 80 feet in width and totaling 20 miles in length on Whiteface Mountain, Essex County, New York. Such inroads on the natural forest vegetation of the mountain would initiate erosion and the serious consequences it entails. The Torrey Botanical Club, therefore, strongly urges that the proposed amendment be defeated.

After discussion of the motion, Dr. Bonisteel seconded the motion and the Club voted that the resolution be adopted.

The President stated that the officers had regretted not being able to personally introduce new members to the Club. The Receiving Committee had called his attention to the fact that three members who had joined the Club in recent years were present. He asked Mr. George H. Peters, Miss Ethelwyn Doolittle and Mrs. Herbert Lawrence to rise, and introduced them to the Club.

The scientific part of the program consisted of a talk on "The Vegetation of the Great Smoky Mountains" by Dr. Stanley A. Cain of the University of Tennessee. The speaker's abstract follows:

One hundred Kodachrome slides were used to illustrate some of the more interesting aspects of the flora of the Great Smoky Mountains. Plants of taxonomic or geographic interest were selected to show that the vegetation of the region has had a long and varied history. Some of the more striking affinities of the mountain plants of the Smokies are with Japan and other eastern Asiatic places, with Europe, with the tropics of America, and with the Canadian coniferous forest. Especial attention was given to the Ericales which are represented in the Smokies by a large series of species. An hybrid Azalea complex from Gregory's Bald Mountain was shown with evidence for the intermingling of three parent species: *Azalea calendulacea, A. arborescens* var. *Richardsoni,* and the newly described species, *A. cumberlandense.*

During the discussion following the lecture, Dr. Camp enlarged upon the distribution of the Azaleas and their derivative hybrids.

The meeting was adjourned at 9:30 P.M.

Respectfully submitted,

John W. Thomson, Jr.
Recording Secretary

Minutes of the Meeting on March 19, 1941

The meeting was called to order at 3:30 P.M. by the President, Dr. Karling, at the New York Botanical Garden. Thirty-one members and friends were present.

The minutes of the previous meeting were accepted as read.

Dr. Rickett moved, Dr. Bold seconded the motion and the Club voted that the following be admitted by unanimous ballot to membership in the Club: as annual members, Miss Margaret A. Griffin, 131 Erie Avenue, Midland Park, N. J.; Mr. Walter E. Thwing Chestnut Hill, R. F. D. No. 1, Norwalk, Conn.; Miss G. Elizabeth Ashwell, 444 East 66th St., New York, N. Y.; Mrs. Margaret Heatley Moss, Botany Dept., University, Milner Park, Johannesburg, Union of South Africa; and Mr. J. D. Quackenbush, 608 Lincoln Ave., Hawthorne, N. J.; as associate members, Mr. Ernest Walter, 166 North Mountain Ave., Montclair, N. J.; and Mr. Reiman G. Erwin, 99 Hillside Ave., Mt. Vernon, N. Y.

The following resignations were accepted with regret: from annual membership, Miss Edna Lind, The University, Sheffield, England, and Dr. C. E. B. Bremenkamp, Ostadelaan 14, Bilthoven, Netherlands; from associate membership, Mr. Samuel Bender, 421 East 21st St., Brooklyn, N. Y., and Miss Blanche C. Mayhew, 144 South Second Ave., Mt. Vernon, N. Y.

Dr. Rickett proposed the following amendment to the Constitution: "To Article XIII, after "Index Cards," add the words "and the Memoirs."

In accordance with the Constitution, the proposed amendment was referred to the Council.

The scientific part of the program consisted of a talk by Dr. F. E. Denny of the Boyce Thompson Institute for Plant Research on "Main points and some side issues in attempts to influence the rest period of buds of plants." The speaker's abstract follows:

The topics dealt with were: The use of chemicals in hastening the germination of dormant buds such as those of tubers, bulbs and woody plants; the effect of such treatments upon the respiration, enzyme activity and chemical composition of the plants; the application of these results to certain agricultural practices, a particular instance being that of testing potato tubers for the presence of disease in the interval between harvest in autumn and planting time in the following spring.

The reverse problem, that of inhibiting growth, inducing or prolonging dormancy of buds, especially with potato tubers and gladiolus corms, was shown to have a partial or complete solution, either by the conditions of storage (with gladiolus), or by chemical treatment (as shown by the experiments of J. D. Guthrie with potato tubers).

A discussion was given of the results obtained by L. P. Miller showing that glucosides were formed in the tissues of potato tubers and gladiolus corms, as a result of treatment with ethylene chlorhydrin, by what appears to be a detoxication mechanism, and that with other tissues and other chemicals the product formed is a glycoside in which the sugar constituent is not glucose but is the rather rare sugar gentiobiose.

Finally, attention was directed to the effects of short periods of chilling, 6–24 hours at 0°–5°, in inducing germination of gladiolus corms the dormancy of which had been prolonged for 1–2 years by the conditions of storage, and to the periodic type of respiration rate which may be obtained with the corms, after these long periods of dormancy, by merely alternately removing the corms from the soil and returning them to it.

The meeting was adjourned at 4:45 P.M. to enjoy the tea served by the Entertainment Committee and the New York Botanical Garden staff.

Respectfully submitted,

John W. Thomson, Jr.
Recording Secretary

Minutes of the Meeting of April 1, 1941

The meeting was called to order by the President, Dr. J. S. Karling, at the American Museum of Natural History at 8:15 P.M. Fifty-one members and friends were present.

The minutes of the previous meeting were accepted as read.

It was voted that the following be admitted by unanimous ballot to membership in the Club: as annual members, Dr. M. M. Rhoades, Dept. Botany, Columbia University, New York, N. Y.; Mr. Calvin G. Bliss, 95 Chambers St., New York, N. Y.; Dr. Lauretta Fox, Louisiana State Normal College, Natchitoches, La.; and Mr. V. Eugene Vivian, 190 Carrol St., Paterson, N. Y.; and as associate member, Dr. John R. Mee, 208 Elton St., Brooklyn, N. Y.

The President announced the appointment of the following to serve on the Seventy-fifth Anniversary Celebration Committee: Dr. A. B. Stout, New York Botanical Garden; Dr. H. C. Bold, Barnard College, Corresponding Secretary; Dr. A. H. Graves, Brooklyn Botanical Garden; Dr. P. W. Zimmerman, Boyce Thompson Institute; Dr. Ralph Cheney, Long Island University; Dr. S. F. Trelease, Columbia University; Dr. B. O. Dodge, New York Botanical Garden; Dr. John A. Small, New Jersey College for Women, Rutgers University; Dr. J. M. Fogg, University Pennsylvania; Dr. L. O. Kunkel, Rockefeller Institute for Medical Research; Dr. J. J. Copeland, City College of New York; Dr. H. H. Clum, Hunter College; and Dr. E. W. Sinnott, Yale University.

Dr. Small reported an interesting itinerary through New England planned by the Field Committee for the summer meetings with the American Botanical Society.

The President welcomed the members of several out of town institutions who were present for the meeting.

The scientific part of the program consisted of a talk by Professor Fredda D. Reed of Mt. Holyoke College on "Fossil Plants from the American Coal Fields." The speaker's abstract follows:

Carboniferous plant remains fall in to general categories: (1) Impressions, casts and molds, which show the superficial characters of form and size and make possible the reconstruction of the habit of the plant; and, (2) Petrifactions or "coal balls," fossils with cellular structure preserved revealing the anatomical and morphological features. Reconstructions of the dominant genera of the five orders, *Articulatales, Lepidodendrales, Filicales, Cycadofilicales,* and *Cordaitales,* together with selected structural details of vegetative and reproductive organs of each were illustrated.

The meeting was adjourned at 9:30 P.M.

Respectfully submitted,

John W. Thomson, Jr.
Recording Secretary

Minutes of the Meeting on April 16, 1941

The meeting was called to order by the President Dr. J. S. Karling, at 3:30 P.M. at the New York Botanical Garden. Twenty-seven members and friends were present.

The minutes of the previous meeting were adopted as read.

It was voted that the following be admitted by unanimous ballot to membership in the Club: as associate members, Mrs. Virginia G.

Richards, 153 East 31st St., New York, N. Y., and Miss Gladys E. Broun, 1701 Drummond Ct., Asbury Park, N. J.; and as annual members, Dr. Carl Epling, 372 S. Carmelina Ave., Los Angeles, Calif.

Dr. Bold announced that the meeting on May 6 would be held at Columbia University, and the meeting on May 21 would be held at the Boyce Thompson Institute for Plant Research in Yonkers, N. Y.

Dr. Dodge moved that the Treasurer be authorized to execute the documents from Lord, Day and Lord, attorneys, to receive for the Club the sum of $850.00 from the estate of Nathaniel Lord Britton. Dr. Camp seconded the motion, and the Club so voted.

Dr. Karling announced that since the Academy Bulletin for May had gone to press the amendment to Article III of the Constitution proposed by Dr. Ricket would be printed in the fall.

The scientific part of the program consisted of a talk by Dr. Charles A. Berger, S.J., of Fordham University, on Polysomaty in Spinacia. The speaker's abstract follows:

A critical summary of the work on Polysomaty in Spinacia was first presented. The different degrees of polyploidy found in the cells of the root tip periblem are probably the result of double chromosome reproduction in the resting nucleus. Metaphases showing closely paired chromosomes indicate that the chromosome reproductions occurred in the preceding resting stage, when no pairing is evident one or more divisions have intervened since the coubling process. The relation of the study of Polysomaty to problems of cell size, cell division and chromosome reproduction were discussed.

The meeting was adjourned at 4:30 P.M. to enjoy the tea served by the Entertainment Committee and the New York Botanical Garden staff.

Respectfully submitted,

John W. Thomson, Jr.
Recording Secretary

Minutes of the Meeting of May 6, 1941

The meeting was called to order by the Vice-President, Dr. E. B. Matzke, at 8:20 P.M. at Columbia University. Forty members and friends of the Club were present.

The minutes of the previous meeting were adopted as read.

It was voted that the following be admitted by unanimous ballot to membership in the Club: as annual member, Professor Guil-

lermo Ebel, Director Biology Department, Colegio San Ignacio, Casilla 597, Santiago, Chile; as associate members, Mr. Robert Marks, 91 Pitt St., New York, N. Y.; Dr. Bernard A. Friedman, 2284 Nameoke Ave., Far Rockaway, N. Y.; and Mr. Jerome Metzner, 600 West 218th St., New York, N. Y.

The resignation of Mrs. Richard Fondille, 119 West 71st St., New York, N. Y., from annual membership was accepted with regret.

The death of Mr. Adolph Henning, 421 Hillside Pl., South Orange, N. J., associate member of the Club since 1939 was announced with deep regret. It was voted that a letter expressing the deep regret and sympathy of the Club be sent by the Corresponding Secretary to the surviving members of the family of Mr. Henning.

The scientific part of the program consisted of a talk by Professor M. A. Chrysler of Rutgers University on "Botanical Explorations in Costa Rica." The speaker's abstract follows:

This trip was undertaken chiefly in order to secure preserved material of the tropical fern family Gleicheniaceae. Dr. W. E. Roever was the other member of the party, and acted as photographer. After a two-week stop in Jamaica a week was spent at the laboratory on Barro Colorado Island, Canal Zone, where the excellent arrangements gave an opportunity for getting acquainted with the vegetation of low altitudes.

Proceeding to Costa Rica, the little city of San José, situated at an altitude of 3,800 feet, formed a particularly pleasant spot for headquarters during July and August, while Varra Blanca and El General were used as temporary bases. Both of these villages presented interesting examples of primitive living conditions, the first in a rather chilly dairying region at an altitude of 6,000 feet, and the other in a bean growing region at 2,200 feet. Shorter excursions were made to the crater of Volcan Poas (9,000 feet) and other localities chosen by the director of the National Museum. The astonishing epiphytic vegetation of these regions, consisting chiefly of ferns and orchids, together with clambering ericads and melastomes, was briefly described by the speaker. Specimens of a few plants from the collection of over 1,100 sheets were shown, also kodachrome views were exhibited.

The meeting adjourned at 9:30 P.M. to enjoy the tea served by the members of staff of Columbia University.

Respectfully submitted,

John W. Thomson, Jr.
Recording Secretary

FIELD TRIPS OF THE CLUB

Trip of January 25, 1941, to Osborn Botanical Laboratory

Eight members visited the Osborn Botanical Laboratory at Yale University. Dr. Alexander W. Evans was our host. His comprehensive herbarium of Cladoniae was our objective. The abundance of material, the complete library, the kindness and competence of Dr. Evans left nothing to be desired. Be it the study of a rare or difficult species, the precise locating of a locality from which collections had been made, or the checking of identification and synonomy on early Pennsylvania collections, no request was too trivial or too great. This indeed was an ideal trip for the serious student.

John A. Small

March 14–16 to the Mohonk Sugar Bush

Eighteen people braved typically March weather and enjoyed a variety of activities. Due to continued cool weather the trees had just been tapped but there was a good run of sap on Saturday. We were able to see the whole process of making maple syrup except the final boiling. The Mohonk sugar bush is purposely operated by old-fashioned methods with sumach spiles and a large open kettle for boiling. A detailed description was given in Torreya, May-June, 1939.

Skating, snowshoeing, coasting and skiing were all enjoyed, but to many the supper at the Log Cabin was the outstanding event. The meal was cooked in the great fireplace and eaten by candlelight. The leader's much talked of supper surprise turned out to be a fresh strawberry shortcake!

Daniel Smiley, Jr.

Trip of March 30, 1941

Fourteen members and friends under the leadership of Dr. John W. Shive of Rutgers University worked on the section of the Appalachian Trail located between Millbrook Road and Flatbrooksville Road in Warren-Sussex Counties, New Jersey. Brush and down trees were removed and the blazes were repainted. On the return hike a list of plants, excluding lichens, was made. Eighty

species were recorded at this season of the year. The list is filed with the field committee and it is hoped that additions may be made as others visit the trail in this area at different seasons. We have previously recorded some thirty lichen species, including forms of Cladonia species.

John A. Small

Trip of April 17 to Boyce Thompson Institute for Plant Research

Approximately thirty people arrived at the Institute at 2 o'clock. We spent from 2 to 4 going through the building and the greenhouses. We discussed a few projects in some detail and talked in general about the work at the Institute. While visiting my laboratory the group was given a demonstration of formative effects of B-naphthoxyacetic acid and samples of seedless tomatoes which were induced by this compound. In another laboratory they saw potato chips and learned that variation in color of the potato chips is usually associated with variation in content of reducing sugars. Members of the party came from Pennsylvania, New Jersey, and New York. The University of Pennsylvania was represented by Dr. E. T. Wherry and several members of the graduate school. The New Jersey College for Women was represented by Dr. Small and several others from Rutgers University. Dr. Trelease came with a group from Columbia University. The field committee was represented by Dr. James Murphy and several other members. Though the names were not recorded, the rest of the group was made up of members and associate members of the Torrey Botanical Club.

P. W. Zimmerman

Trip of April 27 to Bushkill Falls, Pa.

More than thirty members of the Torrey Botanical Club gathered at Bushkill Falls on Sunday morning, April 27, to study the flora, especially the bryophytes, and to make comparisons with the data that have been assembled in this locality during the past several years (Torreya **40**: 175–177). Mr. Nearing contributed much by discussing the lichens, some of which are not generally found, and Dr. Higinbotham identified many of the more puzzling mosses. Most of the genera and species of the bryophytes examined had been collected here in previous years, though we had not noticed

Radula obconica and *Riccardia sinuata* before; both are rather uncommon. *Lophocolea heterophylla* showed abundant sporophytes, while *Ptilidium pulcherrimum* had open capsules fuzzy with brown spores and elaters. In *Conacephalum conicum* the female receptacles extended up several inches, while *Marchantia polymorpha,* associated with *Riccardia* and *Sphagnum,* showed very numerous male receptacles and very few of their feminine counterparts. In *Reboulia hemispherica,* which grows abundantly close to the Falls, the receptacles were just developing. The bases of the trees in a swamp north of the Falls are especially favorable for the growth of *Thelia hirtella,* and this moss was dotted with sporophytes showing the immaculate white peristomes. *Dicranum fulvum* (in "fruit"), *D. scoparium,* and *D. undulatum* were all growing close together.

The warm days of recent weeks were reflected in the flowering of some of the seed plants, so that the Shadbush was well along; the Gold Thread, *Coptis trifolia,* added a touch of color to the marshes with its greenish white flowers; while the Fringed Milkwort, *Polygala paucifolia,* showed buds that were nearly open and in a few instances flowers that had actually expanded. It is of course difficult to make comparisons in phenology even from written records, but most of us felt that these flowering plants were distinctly farther along than they were at the time of the trip of last year, which was held on April 28. Apparently we are getting back to the warm, dry part of our climatic cycle.

EDWIN B. MATZKE

TRIP OF MAY 4, 1941, TO CHESTER, N. Y.

This trip was originally scheduled to visit the colony of *Cetraria islandica* on Hogencamp Mountain in Palisades Interstate Park near Arden, N. Y. Due to the fire hazard, however, the Governor had declared all state parks closed. A group of twelve members and friends turned up at the Arden station so the group went by automobile to a region near Chester, Orange County, N. Y., where Mr. G. G. Nearing had previously collected lichens.

Here, on Goat Hill, an outcropping of calcareous shale yielded a number of crustose lichens which were collected for further study. Species such as *Acarospora fuscata, Rhizocarpon petraeum* var. *confervoides,* and *Urceolaria scruposa* were common. A yellow,

powdery, sterile thallus on the underside of almost every stone in the base of an old wall was puzzling until apothecia were discovered by Mr. James McGrath. Mr. Nearing later determined this crustose lichen to be *Lecidea lucida.* A number of Cladonias were collected on this hillside, including *C. cristatella* ffs. *vestita* and *abbreviata, C. mitrula* f. *imbricatula, C. chlorophaea* f. *simplex, C. delicata* f. *quercina, C. pleurota, C. furcata, C. Floerkeana, C. rangiferina* and *C. coniocraea.*

After lunch, the party moved on to climb Sugarloaf Mountain, a crystalline rock hill. On the rocks *Cladonia pyxidata, C. uncialis, Stereocaulon paschale* and *Lecanora rubina* were collected. Along the trail up, a tree yielded an abundance of *Physcia tribacia* in fruit, *P. endochrysea,* and *P. stellaris.* More of the unusual *Lecidea lucida* was found on the walls of the old roadway on the way up. It was fruiting in greater abundance than on Goat Hill but was difficult to collect as it chose to grow in the darker crannies in the bottom of the wall. The best find of the day was made by Dr. M. L. Massey. On the way up the southwestern slope of the hill she found a colony of the "Iceland Moss," *Cetraria islandica.* When further search of the slope was made, the colony was found to be of large size and the plants luxuriant, with broad lobes. It is not likely to be much disturbed as it is off the regular trail by which hikers ascend the southern face of the hill. This find adds a new station to the scanty records of this interesting lichen in the range of the Torrey Botanical Club.

J. W. Thomson, Jr.

Trip of May 16–18 to Branchville, N. J.

The Sixteenth Annual Nature Conference of the Club at Branchville, N. J., was held May 16–18, 1941. Mr. Wallace M. Husk, manager of the hotel, "The Pines," made the arrangements and was host. At least one hundred persons were present. More than ninety registered at the hotel and others stopped nearby or came for only one or two of the walks.

The leaders were Dr. J. M. Johnson in charge of the bird walks, William Hassler who led trips for the study of reptiles and amphibians, Dr. John W. Thomson in charge of lichens and liverworts, W. H. Dole who conducted trips for ferns and the writer who led hikes for the study of trees, shrubs, and flowering plants. Insects

and other objects of nature came in for attention when interesting species were found.

On Friday evening, May 16, the writer gave an illustrated talk on "Snapshots About the Pines," showing pictures of animal and plant life that he had taken on previous nature conferences. On the evening of May 17, Dr. J. M. Johnson lectured on "Mammals of the Rocky Mountain Region," illustrated with slides made from his own photographs. This was followed by movie reels of animal life made and shown by Mr. Hassler.

About eighty persons took part in the various bird hikes and eighty-nine species were observed. Two of these were new to the region, a White-winged Scoter and a Glossy Ibis. The latter bird, far out of its range, was observed by several good bird students at close range and Dr. Johnson believes there is little doubt as to the correctness of the identification. All observations were made within ten miles of Branchville. A pair of Pileated Woodpeckers were observed at their nest, and a pair of Great Blue Herons were constructing a nest and a pair of Florida Gallinules were observed at close range.

Mr. Hassler's walks were much enjoyed, especially by teachers of biology. He put up an exhibit of live animals, chiefly reptiles and amphibians that were collected on the trips around Branchville. Dr. Thomson also assembled an interesting exhibit of lichens collected by his groups. These labeled specimens were studied at odd moments.

An aggregate of sixty or more members and guests took part in the three fern hikes led by Mr. Dole. Thirty-two species of ferns were observed. Among the ferns found, the Smooth Cliff-brake, *Pellea glabella,* and the Narrow-leaf Spleenwort, *Diplazium pycnocarpon,* are comparatively rare in New Jersey.

While this is marked the "Sixteenth" Annual Nature Conference held at Branchville, N. J., it is really the seventeenth. The first was held May 14–16, 1925, with Dr. H. A. Gleason of the New York Botanical Gardens and the writer as leaders. About twenty-five persons were in attendance at the first meeting. There have been held sixteen annual nature conferences since that time. Certain changes have taken place in the plant life since the first meeting. Some species have increased in numbers, others have decreased and a few have apparently disappeared. Occasionally a

new plant appears. The colony of *Marsilea quadrifolia* which was observed last year for the first time has greatly increased. The lake has receded due to dry weather, now the plants cover the mud and wet sand in that area. This year we noticed a colony of *Callitriche,* apparently *C. heterophylla,* floating on the surface of a pool by the front lake. A fine plant of Ginseng, *Panax quinquefolium,* grew near the wood-road back of the hotel. It has disappeared. In the last three or four years we have seen no Long-bracted Orchids, *Coeloglossum bracteatum.* Formerly several grew near the hotel.

OLIVER PERRY MEDSGER

TRIP OF MAY 24 TO TRICKER'S GREEENHOUSES, SADDLE RIVER, N. J.

Ten members and guests of the Club in addition to the leader visited the Tricker gardens at Saddle River during the afternoon. The group collected both in the numerous pools under glass and those out of doors. Some forty-five genera of algae, some represented by several species, were observed macroscopically and microscopically. Among the forms collected *Volvox weismannia* Powers and *Ploeodorina californica* Shaw were present in great abundance and in all phases of sexual and asexual reproduction. The most thrilling find of the afternoon was an abundant growth of *Sphaeroplea annulina* (Roth) Ag. The presence of Professor T. E. Hazen contributed materially to the success of the collecting trip.

HAROLD C. BOLD

TRIP OF JUNE 7 TO LOCAL FLORA SECTION, BROOKLYN BOTANIC GARDEN

Five members attended the trip to the "Local Flora Area" of the Brooklyn Botanic Garden to see native plants, found within a hundred mile radius of New York City, growing in cultivation. In the Brooklyn Botanic Garden the plants are arranged in ecological groups. Thus in one afternoon we saw plants typical of the Pine Barrens, Serpentine areas, Long Island ponds, northern woodlands, meadows, and bogs.

Especially noteworthy this afternoon were *Xerophyllum asphodeloides* with its showy racemes of cream colored flowers; *Chamaelirium luteum,* Blazing Star; and *Tephrosia virginiana,* Goat's

Rue. Other interesting plants noted were *Hydrophyllum virginianum,* Waterleaf; *Sarracenia purpurea,* Pitcher Plant; *Gaylussacia dumosa,* Dwarf Huckleberry; *Penstemon Digitalis; Anemone canadensis,* Meadow Anemone; *Kalmia latifolia;* and *Kalmia angustifolia.*

We also paid a short visit to the Rose Garden which was at its best at this time.

ELIZABETH ASHWELL

TRIP OF JUNE 15, 1941, TO FORKED RIVER, N. J.

The June 15 trip of the Torrey Botanical Club to Forked River, N. J., took a group of hardened naturalists into one of the best sections of the Pine Barrens for the study of bog and barrens plants. The group met at the railroad station and followed the tracks south, stopping at the three bogs that extend along the branches of Forked River, and at several spots in the pine woods. The lake on the north branch has been drained for two years, and on the muddy bottom a striking growth of *Drosera longifolia* L. (Long-leaved Sundew) has developed. In the middle branch bog the other two common sundews, *Drosera rotundifolia* L. and *D. filiformis* Raf. were found. The young leaves and peduncles of *D. filiformis* Raf. showed nicely that interesting "fern" character of being rolled up in the bud like the "fiddle-heads" of our common ferns. Among the interesting bog flowers observed were *Narthecium americanum* Ker. (Bog Asphodel), *Pogonia ophioglossoides* (L.) Ker. (Rose Pogonia), *Arethusa bulbosa* L. (Dragon's Mouth), *Calopogon* (*Cathea*) *pulchellus* (Sw.) R. Br. (Grass Pink)—including an albino specimen, *Polygala lutea* L. (Orange Milkwort), *Kalmia angustifolia* L. (Sheep Laurel), *Magnolia virginiana* L. (Sweet Bay), and *Utricularia fibrosa* Walt. (Bladderwort). The pitcher plants (*Sarracenia purpurea* L.) were past their prime, but several very fine mats of plants were noted. The abundance of *Schizaea pusilla* Pursh in the middle branch bog seems to be as great as ever. On many hummocks one could find five to ten specimens, most of which had a few unrolling sporophylls. Last year's fertile fronds were still present but rather brittle. As a suggestion to botanists seeking this inconspicuous fern, it is usually encountered on the hummocks around the bases of White Cedar trees and around old stumps, at about the level where the *Sphagnum* gives way to lichens such as *Cladonia*

squamosa (Scop.) Hoffm., *C. calycantha* Del., *C. cristatella, C. pyxidata* (L.) Hoffm., *C. sylvatica* (L.) Hoffm., and *C. tenuis* (Fl.) Harm. Among the interesting lichens encountered in the bog was *Cladonia impexa*. Harm. This seems to be the only known station for this lichen in New Jersey. Growing on an island in the south branch we found a quite large colony of *Smilax laurifolia* L.

Among the barrens plants, the oaks are especially interesting and numerous. Those identified were *Quercus alba* L. (White Oak), *Q. stellata* Wang (Post O.), *Q. prinoides* Willd. (Scrub Chestnut O.), *Q. prinoides* var. *rufescens* Rehder, *Q. primoides* form with very small leaves, *Q. montana* Willd. (Chestnut O.), *Q. borealis* Michx. f. var. *maxima Ashe* (Red O.), *Q. coccinea* Muench. (Scarlet O.), *Q. velutina* Lam. (Black O.), *Q. falcata* Michx. (*Q. rubra* L.) (Spanish O.), *Q. ilicifolia* Wang. (Black Scrub O.), *Q. marilandica* Muench. (Black Jack O.), and *Q. phellos* L. (Willow O.). As is usual where several species of oaks occur together, a few hybrids were encountered. Of these, the cross between *Q. ilicifolia* Wang. and *Q. marilandica* Muench. (× *Q. Brittoni* W. T. Davis) was common. Single specimens only of the following were seen: *Q. ilicifolia* Wang. × *Q. falcata* Michx., *Q. alba* L. × *Q. prinoides* Willd. and *Q. stellata* Wang. × *Q. prinoides* Willd.

In all a total of some 228 species of plants were recognized.

JOSEPH J. COPELAND

NEWS NOTES

The centennary of the Royal Botanic Gardens at Kew occurred April 1. Previous to 1841 the gardens had been the private property of the royal family. Sir Arthur Hill, the present director, gave an account of the gardens activities during the century of progress before the Linnean Society.

In the October issue of the Bryologist, the journal of the Sullivant Moss Society, is a special check list of the mosses of North America north of Mexico by Dr. A. J. Grout. Dr. Andrews has a list of the North American Species of Sphagnum, and Dr. Evans gives a check list of the Hepaticae in the United States, Canada and Arctic America.

Dr. C. H. Goulden, senior agricultural scientist, of the Dominion Rust Research Laboratory, Winnipeg, gave the tenth Frank Azor Spragg Memorial Lecture during February at the Michigan State College. He lectured on "The Fundamentals of Experimentation."

Dr. William J. Robbins has been named chairman of the National Science Fund which was organized as a foundation to receive and adminster gifts for the advancement of science. The foundation was set up in April by the National Academy of Sciences. Under the direction of Dr. A. F. Blakeslee a committee had made a thorough study for the need of such a body to assist and give financial support for research. The first board of directors consists of twelve distinguished laymen and twenty scientists from the National Academy.

Over forty students of the Jewish Hospital School of Nursing completed their spring course of instruction at the Brooklyn Botanic Garden. The course consisted of a study of more than fifty medicinal plants as they are growing on the grounds of the Garden and in the conservatories, as well as attendance at lectures and demonstrations of economic plants, the care of cut flowers, and a laboratory study of plant tissues and functions.

At the annual Commencement of Swarthmore College announcement was made of the Award of the Arthur Hoyt Scott Garden and Horticultural Award, including a Gold Medal and a $1,000.00 Cash Prize, to Dr. C. Stuart Gager, Director of the Brooklyn

Botanic Garden, for the work which has been accomplished under his directorship during the past thirty years. Swarthmore College is merely the custodian of the funds of this endowment, and the College President acts as Chairman of the Committee of nine, which includes representatives of various horticultural organizations. The stated purpose of the Award is to promote a greater love of nature, make the nation more conscious of the beauty of the outdoors, develop a greater knowledge and love of plants and flowers, spread the gospel of planting and designing, and arouse a wider interest in better planting and more beautiful gardens.

Word has been received that Dr. Gager was made an Honorary Member of the Royal Agricultural and Horticultural Society of India at the meeting of the Society last February.

THE TORREY BOTANICAL CLUB

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BY

WILLIAM J. BONISTEEL

John Torrey, 1796-1873

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The Great Swamp

KENNETH E. WRIGHT

The Great Swamp is in the town of South Kingstown in southern Rhode Island, near the village of West Kingston. About 1.5 miles west of the West Kingston rotary on the South County Trail (State Route 2) a sign has been erected in commemoration of the Great Swamp Fight. This sign proclaims that "Three-quarters of a mile to the southward on an island in the Great Swamp the Narragansett Indians were decisively defeated by the united forces of the Massachusetts Bay, Connecticut and Plymouth Colonies, Sunday, December 19, 1675." This battle broke the resistance of the Indians under King Philip, and is responsible for the swamp often being called King Philip's Swamp. The region is approximately ten square miles in area. This figure includes all that land within the encircling one hundred foot contour line, omitting most of the extensions of the swamp along the tributaries, and including that high land known as Great Neck which extends from the north to the margin of Worden's Pond. The highest point on Great Neck is 155 feet, and the lowest elevation is 94 feet at Worden's Pond in the south. From the center of Worden's Pond to the center of Larkin's Pond in the northeast corner of the swamp, a straight-line distance of about 2.5 miles, the increase in elevation is one foot. Between the lowest and highest points of this general area there is a wide diversity of habitat, affording the botanical explorer an ever-changing shift of scenes.

Worden's Pond is the largest body of fresh water in Rhode Island. With an expanse of some 1,400 acres the average depth is about 3.5 feet. In many places a luxuriant growth of Juncus-

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Scirpus-Xyris extends for several hundred yards from shore, and occurs in scattered stands over the surface of the pond. Wading through the shallows one finds such characteristic aquatics as *Castalia odorata, Nymphaea advena, Hydrocotyle umbellata, Eriocaulon articulatum, Lobelia Dortmanna, Sabatia dodecandra, Decodon verticillatus, Gratiola aurea, Hypericum virginicum, Lacnanthes tinctoria, Pontederia cordata,* and species of Sagittaria, Utricularia, and Cicuta. There is one small island with a single red maple tree and a thick covering of button bush. During periods of high water the island is practically submerged. The pond is a favorite feeding ground for herons and migratory and indigenous ducks. The tree and shrub complex along the margins of the pond depends primarily upon the elevation. Characteristic associations are described later in this paper.

Larkin's Pond has much the same flora as Worden's Pond, although to a lesser degree, as there is much less shallow water. Depths of eight to ten feet are common. Although the old topographic sheet indicates a tributary, today there is no inlet or outlet.

Of the various streams which flow through the swamp the Chipuxet River is typical. Canoe travel is interesting largely because of the difficulties encountered. In places the rushes, sedges, water lilies, Potamogetons, and bladderwort grow so luxuriantly that the canoe must be poled or carried. Tortuous bends where the overhanging shrubs are covered with poison ivy add to the difficulties. At places the stream spreads out to such an extent that discovering the main channel is largely guess work. An apparently open stretch of water may end in a mud bank. Pickerel weed, bur-reed, *Iris versicolor* and *Iris pseudacorus* are among the more conspicuous of the aquatics along the margins with here and there the cardinal flower prominent with its brilliant splash of color. Rather profuse stands of wild rice probably account for this being a favorite breeding and feeding ground for ducks. Occasionally the stream is almost obscured where the arching swamp loosestrife grows from either bank. This loosestrife seems to be a favored host for dodder. The stream meanders through the Typha-Phragmites marshes, the typical lowland shrub complex, the more open rush-sedge-grass wet meadows, and empties into the northeast point of Worden's Pond.

Pools of various sizes, depth, and degree of permanence are found throughout the lowland area. In addition to the aquatics

previously mentioned, many of these small bodies of water may contain practically pure stands of *Dulichium arundinaceum, Woodwardia virginica, Equisetum fluviatile,* or *Proserpinaca palustris.* Where the water is deeper and bottom attached plants are less in number, *Nymphoides lacunosum* may grow so thickly that the surface of the water is practically obscured. Other pools, particularly those that are more or less seasonal, have a ground covering of sphagnum or sphagnum-cranberry. Commonly associated plants in these boggy areas are *Sarracenia purpurea, Pogonia ophioglossoides, Drosera rotundifolia, Eriophorum virginicum, Eriophorum tenellum,* and *Lycopodium inundatum.* Many of these sphagnum areas have extended over water and muck of considerable depth, furnishing good examples of quaking bogs. Jumping up and down on the sphagnum sets up undulations capable of shaking sizeable shrubs some distance away. Usually the first shrub to become established in these bogs is *Chamaedaphne calyculata.*

In the submerged lowlands the royal fern is usually the first conspicuous plant to become established on the hummocks, and is followed by various shrubs. As the bottom gradually builds up, the shrubs become the dominant growth. Representative specimens in this complex are *Vaccinium corymbosum, Rhododendron viscosum, Clethra alnifolia, Lyonia ligustrina, Viburnum cassinoides, Alnus incana, Ilex glabra, Ilex verticillata, Chamaedaphne calyculata,* and *Salix candida.* The denseness of the growth coupled with insecure footing in water, muck, or loose sphagnum, makes travel through these areas exceedingly strenuous. Even when following the numerous deer trails that interlace the area, progress is none too easy.

Occasional trees that follow the shrubs are usually red maple, black gum, Chamaecyparis, white pine, or oaks. This first invasion of trees is not always successful. As one walks northeast along the railroad from Kenyon he may get the impression that fire had swept the area, an impression belied by the fact that with the exception of the hummocks this region is in most places waist deep with water. The scattered skeletons of dead trees are more probably the result of a period of unusually high water following a rather prolonged period in which the water table was sufficiently low to provide for the aeration of the roots of the trees which had become established on higher ground. However, there are extensive tracts where the

dominant growth is forest. Roughly, this forest covering may be divided into four general types in which the dominant trees are: (1) *Chamaecyparis thyoides,* (2) red maple, (3) white pine, and (4) oaks.

The most extensive Chamaecyparis bog in the northeastern section of the Great Swamp was largely cut over in 1927 and 1928. Several rather inaccessible areas were left untouched, so that it is possible to study the original cover as well as the succession since deforestation. A pure stand of Chamaecyparis has a second-story growth made up almost entirely of *Rhododendron maximum.* These old bushes have in many cases reached a height of twelve to fifteen feet, and grow so thickly tangled that progress through them becomes a scramble through, over, and under the low spreading branches, with a slip into fairly deep sphagnum pockets enlivening the struggle. Inkberry is another prominent undershrub in this habitat. Cinnamon fern, more than head high in late summer, is the most conspicuous ground cover with *Chiogenes hispidula* rather abundant on the elevated hummocks at the bases of the cedars.

That portion of the cedar bog which was cut over about thirteen or fourteen years ago is interesting in that the swamp white cedar is succeeding itself. A thick growth of head-high cedar is the dominant cover, the only other tree seedlings at all conspicuous being red maple and yellow birch. Several shrubs are also established, but this shrub growth has a different aspect from that previously described. *Rhododendron maximum, Nemopanthus mucronata,* and *Rhus vernix* are as conspicuous here as they are inconspicuous in those areas not succeeding Chamaecyparis. The old slashings are now almost completely covered with sphagnum moss, in places still insufficiently thick to prevent one from breaking through and falling down into a tree top. *Calopogon pulchellus, Pogonia ophioglossoides, Drosera rotundifolia, Cornus canadensis, Clintonia borealis, Viola blanda, Coptis trifolia, Habenaria blephariglottis,* and *Sarracenia purpurea* are some of the herbaceous representatives of the ground cover.

White pine is an isolated tree throughout the lowlands, and in various areas is the dominant tree growth. Near the cedar bog just described there are several acres in which white pine has apparently succeeded Chamaecyparis. This general area is rather flat with the cedar sparsely scattered in the ditch like gullies from one to two feet lower than the general level occupied by the taller

white pine. Here rhododendron is again the conspicuous undershrub. This white pine stand has a different aspect from that found on higher, better drained land where the pines grow so thickly that there is practically no undergrowth. The lowland pines have an extensive admixture of broad leaved trees, particularly red maple and yellow birch. The hurricane of the fall of 1938 materially affected the white pine stands. Those in the lowlands were decimated by being blown over, the roots in the saturated soil providing insufficient anchorage to resist the high wind velocities. Many of the upland pines were either broken off, or had the foliage burned by the wind and the salt spray to such an extent that the trees failed to recover. It will be interesting to note in the future how this damage by the hurricane will affect the succession on those areas where the white pine previously was dominant.

Probably the most characteristic tree cover from the viewpoint of area covered is the red maple. This cover varies from thick, pure stands to the more open, scattered cover throughout the marsh lands, where the typical shrub complex and marsh vegetation has not yet given way to a forest canopy. The trunks of many of the trees are covered with a thick growth of Usnea.

At a slightly higher elevation than that of the red maple the typical tree cover is made up primarily of a mixture of white, black, red, swamp white, and pin oaks, with an admixture of red maple, yellow birch, white ash, black gum, and white pine. The American holly which is found scattered throughout the area is more common in this particular association. Witch hazel and spice bush are additions to the scattered representatives of the usual swamp shrub mixture. Rhododendron is conspicuous in the shallow ravines. Whereas sphagnum is the principal ground cover in the lower, more open areas, the floor of the woods in the better drained areas contains such representative plants as *Maianthemum canadense, Aralia nudicaulis, Trientalis americana, Panax trifolium, Mitchella repens, Arisaema triphyllum, Lycopodium obscurum,* and a few scattered specimens of *Trillium undulatum.*

In the sharp contrast to the luxuriant cover of the wet areas there are extensive tracts of infertile, sandy soil which may be so dry that the only ground cover is reindeer moss. The first adventive into this cover is usually *Andropogon scoparius.* Typical shrubs which follow are *Arctostaphylos Uva-ursi, Kalmia angustifolia, Myrica asplenifolia, Myrica carolinensis,* and *Juniperus communis.*

Where these meadows dip toward swamp level, areas with a higher moisture and humus content in the soil, *Aletris farinosa* and *Habenaria ciliaris* are conspicuous. The Andropogon-low shrub areas may be succeeded by an open stand of pitch pine or red cedar, or a mixture of both. On the other hand the succession may lead to the blueberry meadow characterized by a rather open stand of various species of Vaccinium associated with *Pyrus arbutifolia, Pyrus melanocarpa, Kalmia angustifolia, Myrica asplenifolia, Quercus ilicifolia,* and *Amelanchier canadensis.*

That highland known as Great Neck extending from the north to the margin of Worden's Pond is covered by the oak association that characterizes most of the hill land of South County. For the most part a mixture of white, black, red, and scarlet oaks with occasional hickory is the dominant cover. Chestnut tree skeletons, stumps, and sprouts indicate that before the chestnut blight the principal cover was chestnut-oak. Shrub growth is primarily *Kalmia latifolia* and species of Gaylussacia. Representative plants in the ground cover are *Chimaphile maculata, Pyrola americana, Lycopodium complanatum, Cypripedium acaule,* and very thick stands of *Gaultheria procumbens.* At the foot of the hills at the line of mergence with the swamp vegetation, and in those ravines which run into the swamp, the oaks give way to beech, yellow birch, sassafras, and red maple, with an under-story of witch hazel, spice bush, rhododendron, and inkberry.

The "island" where the forces of King Philip were defeated by the colonies is an island only in the sense that it is a small area of land slightly elevated above the surrounding swamp. That this was a location generally above the high water mark, and thus suitable for a permanent campsite, is evidenced by the fact that pitch pine is the dominant tree, although the oldest and largest of the trees perished during the hurricane of 1938. The Indians overlooked the possibility of the pioneers invading their supposedly impregnable fortifications during the winter when progress through the swamp was made relatively easy over the thick ice. There are probably many regions in the Great Swamp today which have been penetrated only during the winter when footing is comparatively secure.

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Names of American Plants in Books on Kalm's Travels

Compiled by W. L. McAtee

Pehr Kalm (1716–1779) traveled in North America during 1748–1750 as an agricultural explorer for the Swedish Academy of Sciences. He had been a student of Linnaeus and his collections passing through his preceptor's hands furnished the basis for numerous original descriptions of American plants. It is well known that the genus *Kalmia* for the mountain laurel and related species was named by Linnaeus for his protegé. The high percentage (nearly 80) of the plants included in the present compilation that was scientifically defined by that author emphasizes his dominance of the taxonomy of eastern North American plants. Kalm himself was a good botanist and is credited with the authorship of three recognized genera of American plants, namely, *Lechea, Gaultheria,* and *Polymnia.* He spent much of his time in New Sweden, now Delaware, southern New Jersey, and nearby areas, but made excursions also to New York, in addition to an extended trip through the Hudson Valley to Quebec. From what we know of the early settlements, it seems likely that most of the Swedish and English names Kalm reports were in use in the Philadelphia region, the Dutch in the lower Hudson River Valley, and the French in northern New York and Quebec. Most of the terms in this list from the last two languages, however, are those employed by translators. Localities specifically mentioned in connection with the names are entered in parentheses in the following list as are also certain remarks of interest.

This paper has been prepared as a contribution to a glossary of American plant names, not as an index to species mentioned by Kalm. Its scope is restricted to vascular plants and is otherwise specialized. European plants not naturalized in the United States are omitted as are plants given only generic mention in the works consulted; a few even of those accompanied by scientific names have proved unidentifiable. Names that are mere translations of the scientific terms and those that are descriptive phrases rather than names also are excluded. The intent is to present each name only in its indefinite nominative singular form but this has been deviated from in the case of terms generally used in the plural. Modern spellings are given in parentheses.

I have been very fortunate in having the cooperation of Prof. Adolph B. Benson, latest translator of Kalm's works and Head of the Department of Germanic Languages of Yale University, in correcting the manuscript and proof with respect to the German and Swedish names and in furnishing modern equivalents of those in the latter language. With equal kindness Dr. Raymond Kennedy, Assistant Professor of Sociology, in the same school, has corrected the Dutch names. For this aid the writer is most appreciative. Some of Professor Benson's remarks are well worth quoting for the information of those who may make use of this glossary. "Modern Swedish," he writes, "uses hyphens very sparingly, if at all; there is no 'w' except in a few proper and foreign names, and 'f' and 'fv' have become 'v' in most cases except at the beginning of words. Tree terms ending in trä in Kalm would now be träd. Trä in modern Swedish means wood, not tree. . . .

"One reason probably for Kalm's spelling of plant-names was the fact that Sweden had no terms for some of these plants and Kalm made them up, or he followed directly a foreign source, as ulm from the Latin ulmus or German ulme. Today the Swedish for elm is alm."

The works consulted in the preparation of this list of plant names are:

En Resa til Norra America. By Pehr Kalm, 3 vols., Stockholm, 1753–1761.
Resa till Norra Amerika. By Pehr Kalm, Part 4, Helsingfors, 1929. Preceding three parts not available in Washington.
Des Herren Peter Kalm . . . beschreibung der reise . . . nach dem Nördlichen Amerika, etc. 3 vols., Göttingen, 1754–1764. Translation by Johann Andreas Murray.
Travels into North America, etc. 3 vols., Warrington, 1770–1771. By Peter Kalm. Translated by John Reinhold Forster.
Reis door Noord Amerika, gedaen door den Heer Pieter Kalm, 2 vols., Utrecht, 1772.
Histoire naturelle et politique de la Pensylvanie, etc. By Jacques P. R. de Surgy. Paris, 1768.
Voyage de Kalm en Amérique. 2 vols., Montreal, 1880. Translation by L. W. Marchand.
Peter Kalm's Travels in North America. 2 vols., New York, 1937. Translation by Adolph B. Benson.

Systematic List of Names

Polypodiaceae

Polypodium vulgare L.—Engelfusz.
Adiantum pedatum L.—Herba capillaris (Canada); frauenhaar; maagdenhaar, Amerikaansche herba capillaris; capillaire du Canada; maidenhair (by the English in the colonies).

Taxaceae

Taxus canadensis Marsh.—If baccifère.

Pinaceae

Pinus strobus L.—Hvit (vit) tall, Weymouth tall; weisse tanne; witte denneboom; witte dennen (den); pin blanc; white fir tree.

Pinus resinosa Aiton.—Rode (roode) pynboom; pin rouge (French Canada).

Pinus rigida Miller.—Jersey tall; tanne von Jersey; pin cypre, pin à l'encens, sapin de Jersey; Jersey pine, New Jersey fir tree.

Larix laricina DuRoi.—Amerikanskt lärkträ(d); lerchenbaum; mélèse (mélèze), epinette rouge (Quebec).

Picea canadensis Miller.—Weisse fichte; epinette blanche (Lake Champlain; Quebec); hemlock, spruce, white fir.

Picea rubens Sargent.—Epinette rouge.

Tsuga canadensis L.—Kanadensisk gran, Hemlock-gran; Kanadaasche pynboom; perusse, pruche, pin du Canada.

Chamaecyparis thyoides L.—Hvit (vit) ceder (New Jersey), hvit (vit) en; weisse cypresse, weisser wacholder, weisser wachholderbaum; witte ceder (zeder), witte jenever, witte jeneverboom; arbre de vie, cèdre blanc, faux thuya; white cedar, white juniper-tree.

Thuja occidentalis L.—Arbor vitae, lignum-vitae; abendländische thuya; witte ceder (zeder) (Albany), jeneverboom; arbre de vie, cèdre blanc (French Canada); juniper tree (Virginia), white cedar (Albany).

Juniperus communis L.—Enbuske; genevrier commun.

Juniperus virginiana L.—Röd en (en = juniper in Swedish), röd ceder; rothe ceder, rother wacholder; rod ceder (roode zeder), rod (roode) jenever, rod (roode) jeneverboom; cèdre de Virginie, cèdre rouge (French Canada), génèvrier rouge; red cedar, red juniper, red juniper tree.

Typhaceae

Typha latifolia L.—Massette; broad-leaved reed-mace, cat-tail, flag.

Alismaceae

Sagittaria latifolia Willdenow.—Katniss (an Indian name adopted by the Swedes); kätnisz, pfeilkraut; flèche d'eau.

Zizania aquatica L.—Sjö-hafre (sjöhavre); seehafer; folle avoine (French Canada), ivraie; aquatic tare-grass, Indian rice (Quebec), water tare-grass.

Ammophila arenaria L.—Sandrohr; zandriet; seigle de mer (Quebec); sand reed.

Elymus arenarius L.—Sandweizen; zeerogge; seigle de mer, seigle sauvage; sea lyme grass.

Araceae

Peltandra virginica L.—Virginische aronswurz; Virginische kalfsvoet; gouet, pied-de-veau de Virginie; tuckahoo d'Amérique; taaho (taw-ho), taahim (taw-him), tuckah (Indian names of which the first was used by the Swedes); Virginian wake-robin; tukahoo (tuckahoo, tukkahoo of the Carolina Indians seems the same. Hogs feed on the roots).

Orontium aquaticum L.—Taw-kee (taki, taaki), taw-kim (taakim), tack-vim (takvim) (Indian names of which the first was used by the Swedes).

Spathyema foetida L.—Björnblad (eaten by bears when they leave winter quarters), björnrötter (used almost entirely in the plural; singular, björnrot); bärenblatt, bärenwurzel, stinkende zehrwurz; bereblad, berewortel, polecat wortel; racine-d'ours, racine de bête puante; polecat root, polecat weed, skunk-cabbage.

Melanthaceae

Veratrum viride Aiton.—Dock (dack), dockor (dackor), dockrötter (dackretter), (used mostly in the plural; singular, dockrot. Docka = doll. The children made dolls of its stalks and leaves); puppenwurz, weisse nieszwurz; poppewortel, witte nieswortel; ellébore blanc; ellabor, hellebore, itch-weed.

Salicaceae

Populus balsamifera L.—Liard.
Populus heterophylla L.—Vattenasp; espenbaum, wasserespe; waterpopulier; water-poplar (Albany).
Populus tremuloides Michaux—Tremble.

Myricaceae

Myrica gale L.—Porss; galé, laurier (French Canada), myrte bâtard, piment royal, poivrier (French Canada); gale, sweet willow.
Myrica carolinensis Miller.—Talgbuske; talgbusch, talgstrauch; talkboom, talkstruik; cerier de la Caroline, tamarisc; bayberry-bush, candle-berry-tree, tallow shrub.
Comptonia peregrina L.—Myrteboom.

Juglandaceae

Juglans cinerea L.—Butternutsträ(d), oylnutte; noyer cendré, noyer tendre; oil nut (New York).
Juglans nigra L.—Svartnottbom (New Jersey), walnötträ (valnötsträd), svart walnötträ (valnötsträd); schwarznussbaum, schwarzer wallnussbaum; zwartnootboom, zwarte walnutboom; noyer noir; black walnut.

Betulaceae

Carpinus caroliniana Walter.—Amerikansk avenbok; steinbuche; haagbeuk, steenbeuk; bois-de-fer, bois dur (French Canada; Lake Champlain), charme; waterbeech.
Betula papyrifera Marsh.—Gemen (gemeene) berkeboom; bouleau commun; common birch tree.
Betula lenta L.—Hummel-kopp-björk; merisier rouge.
Betula lutea Michaux.—Såcker-björk (sockerbjörk); zuckerbirke; merisier; sugar birch. Recorded as *B. nigra* but more likely this species.
Betula pumila L.—Bouleau nain.
Alnus rugosa DuRoi.—Erle; els.

Fagaceae

Fagus grandifolia Ehrhorn.—Bök (bok); buche; beuk; hêtre.
Castanea dentata Marsh.—Castanieträ (kastanje or kastanjeträd); castanienbaum; kastanjeboom; chataigner.
Castanea pumila L.—Chataigner nain; chinquapin.
Quercus alba L.—Hvit (vit) ek; weisse eiche; witte eik; chêne blanc, chêne de Quebec.
Quercus prinus L.—Castanie-ek (kastanjeek); castanien eiche; kastanje eik; chêne chataignier.
Quercus "rubra L."—Rödek (röd ek), svartek (svart ek); rothe eiche; rod (roode) eik, zwarte eik; chêne noir, chêne rouge; black oak. There may be some confusion here although current manuals admit application of both the names, red and black oak, to this species. Spanish oak, with all the lingual differences in spelling is recorded, but whether it is *Q. rubra* or some other species is uncertain.
Quercus marilandica Muenchhausen.—Schwarze eiche; zwarte eik.
Quercus phellos L.—Kärr-ek; sumpfeiche; moeras eik; chêne de marais; chêne saule; swamp oak.

Ulmaceae

Ulmus americana L.—Amerikansk ulm (alm), hvit ulm (alm); Amerikanischer ulmenbaum, weisse ulme; Amerikaansche olm, witte olm; orme blanc.
Ulmus fulva Michaux.—Rod ulm (alm); rod (roode) olm.
Celtis occidentalis L.—Nössle-trä (nässleträd); westländischer lotusbaum; micocoulier, micocoulier de Virginie; nettle-tree.
Morus rubra L.—Mulbärsträ, röd mulbärsträ (rött mullbärsträd); maulbeerbaum; moerbezieboom; murier, murier rouge.

Loranthaceae

Phoradendron flavescens Pursh.—Gemeine mistel; gemene (gemeen) mistelboompje (diminutive form of boom); gui.

Aristolochiaceae

Asarum canadense L.—Vild ingefära; gingembre (Quebec).

Polygonaceae

Rumex acetosella L.—Bärg-syra; feldampfer; common field sorrel.
Rumex crispus L.—Krauser pferdsampfer.
Polygonum sagittatum L.—Renouee sagittée.

Chenopodiaceae

Chenopodium album L.—Weissgänsefusz; ansérine, chou gras.
Chenopodium ambrosioides L.—Mask-frö, Jerusalems ek; wurmsamen, Jerusalemeiche; wormkruid, wormzaad, Jerusalemeik; wormseed, Jerusalem oak.
Chenopodium rubrum L.—Svinmålla.

Phytolaccaceae

Phytolacca americana L.—Påk; Amerikanischer nachtschatten, päck; Amerikaansche nagtschaduwe (nachtschaduw); morelle, morelle d'Amérique, raisin d'Amérique; American nightshade, poke.

Ranunculaceae

Hepatica americana DeCandolle.—Blå-blomster; leberkraut, zieland; blauwe bloem, leverkruid; belle hepatique, noble hepatique; noble liverwort.
Coptis trifolia L.—Dreyblätterige nieswurz; driebladige nieswortel; tisavoyanne jaune (Quebec); three-leaved hellebore.

Magnoliaceae

Magnolia virginiana L.—Bäfwerträ (bäverträd), karr saltenbrosz; bieberbaum; beverboom, witte laurier; arbre à castor, magnolier; beaver tree, laurel-leaved tulip-tree, swamp sassafras, sweet bay tree, white laurel. (The bark is the chief food of the beaver; the roots are used as bait in beaver trapping.)
Liriodendron tulipifera L.—Canöe-trä (modern kanotträd; used in making dugouts), knuträ, tulipan-trä (tulipanträd); hemd der alten frau, tulpenbaum; kanooboom (kanoboom) oude wyvehembd (wyvenhemd), tulpenboom (tulpeboom); arbre à tulips; tulipier, tulipier de Virginie; canoe tree, old woman's smock (a peculiarity of the leaves suggested this name), poplar.

Annonaceae

Asimina triloba L.—Papaw-trä (papawträd); acimine (Quebec); custard-apple, papaw tree.

Berberidaceae

Podophyllum peltatum L.—Pomme-de-Mai.

Lauraceae

Sassafras sassafras L.—Salzenfras, saltenbras (it makes sparks in a fire like salt), sassafras-trä (sassafrasträd); sassafras baum; sassafrasboom.

Benzoin aestivale L.—Sommer lorbeerbaum, sommerlicher lorbeerbaum; zomer laurier; laurier benjoin, laurier d'été; spice-wood.

Papaveraceae

Sanguinaria canadensis L.—Blodrötter (used mostly in plural form; singular, blodrot), rödbeta (in modern Swedish this means beet); blutwurz; bloedwortel; blood-root.

Cruciferae

Cakile edentula Bigelow.—Raquette de mer; sea rocket.

Grossulariaceae

Ribes americanum Miller.—Svart vinbär; currantbaum, schwarze weinbeere; arbre de courant, gadellier noir; currant tree.

Hamamelidaceae

Hamamelis virginiana L.—Troll haszel (hassel); zauberischer haselstrauch; toveragtig (tooverachtige) hazelaar; coudrier de magicien, coudrier des sorcières.

Altingiaceae

Liquidambar styraciflua L.—Gyllenträ (gyllenträd); güldenbaum, storaxbaum; storaxboom; copal d'Amérique; sweet gum.

Platanaceae

Platanus occidentalis L.—Vassbok, vattenbok; wasserbuche; katoenboom, Virginische ahorn, waterbeuk; cotonnier (French Canada), erable de Virginie, hêtre d'eau, platane de Virginie; buttonwood, Virginian maple, water beech (the "most usual" name).

Malaceae

Malus coronaria L.—Krabbträ (krabbträd); ankerbaum, crabbaum; ankerboom; arbre à ancre, pomme de Sibérie, pommier odorant; anchor tree, crab tree.

Sorbus americana Marsh.—Rönn; sperberbaum, vogelbeerbaum; sorberboom; frêne sauvage, sorbier, sorbier des oiseaux; mountain ash, sorb-tree.

Crataegus "coccinea L."—Coccinellfarbener hagedorn.

Crataegus "crus-galli L."—Hagtorn, tuppspår, hahnspor; hauensporniger hagedorn, hauenfussiger speierlingbaum, Virginischer azarolbaum; alisier de Virginie, aubépine, azerolier de Virginie, ergot-de-coq, senellier; cockspur hawthorn, Virginian azarole.

Crataegus "calpodendron Erhorn."—Currant (fruit very good).

Rosaceae

Filipendula ulmaria L.—Dropwort, meadowsweet, tea-bush (Philadelphia).

Comarum palustre L.—Watervyfvingerkruid; comaret, quintfeuille rouge de marais.

Geum rivale L.—Fluszsarnickel.

Rubus occidentalis L.—Amerikansk(t) björnbär, kännthorn; framboisier, ronce d'Amérique. Most of the translated terms applied to this species mean blackberry, hence are misnomers and are omitted.

Amygdalaceae

Padus virginiana L.—Wilskt kersbärträ (körsbärsträd); wilder kirschenbaum; cerisier à grappes, cerisier sauvage.

Prunus americana Marsh.—Vild plommonträ (vilt plommonträd); wilder pflaumenbaum; doornstruik; sloe shrub.

Caesalpinaceae

Gleditsia triacanthos L.—Honey-locustträ (träd); schotenbaum; acacia à trois épines, arbor à poix, carouge à miel, fevier, fevier à trois épines; honey locust, three-thorned acacia.
Cercis canadensis L.—Sallad-trä (salladträd); salatbaum; salaadboom (saladeboom); arbre à salade, arbre de Judas, bouton-rouge, gainier du Canada; salad tree.

Fabaceae

Lupinus perennis L.—Ringgräs, krusgräs, wild bön (böna, vilda bönor, plural); fortdauerende wolfsbohne; langswärend wolfsbön; lupin vivace.
Robinia pseudo-acacia L.—Locust-trä (träd); heuschreckenbaum, kourbarill; krekelboom, sprinkhaanboom; acacia blanc, acacia commun, arbre à grenouilles (locusts changed to frogs by a translator), courbaril.
Glycine apios L.—Häpniss, hopniss (Indian names adopted by the Swedes); Indianische erdnusz; féverole.
Lathyrus maritimus L.—Gesse maritime, pois de mer; seaside pea.

Linaceae

Cathartolinum virginianum L.— Virginischer wildflachs; Virginisch vlas.

Oxalidaceae

Oxalis acetosella L.—Sauerklee; oseille sauvage; wood-sorrel.
Xanthoxalis corniculata L.—Oseille jaune de bois.

Geraniaceae

Geranium maculatum L.—Fleckiges storchschnabelkraut.
Geranium robertianum L.—Ruprechtskraut.

Polygalaceae

Polygala senega L.—Polygale de Virginie, racine aux serpents à sonnettes.

Anacardiaceae

Rhus glabra L.—Glatter schlingbaum; sumac doux, vinaigrier.
Toxicodendron vernix L.—Förgiftigt trä (giftigt träd); giftiger baum; vergiftige sumach (sumak), vergiftboom; arbre pestifère, sumac poison, sumac vénéneux; poison tree, swamp sumach.
Toxicodendron radicans L.—Windende sumach, wurzelschlagender schlingbaum; opklimmende sumach (sumak); sumac grimpant, sumac rampant; twining sumach.

Ilicaceae

Ilex opaca Aiton.—Stecheiche; hulst; houx.
Ilex glabra L—Bois de marque (Quebec); inkberry.
Ilex verticillata L.—Prinos de marais; winterberry.

Aceraceae

Acer rubrum L.—Rödblommig lönn; maserichter ahornbaum, rothblümiger ahorn; roodbloemige ahorn; erable rouge, plane; red-flowering maple.
Acer saccharum Marsh.—Såckerlönn (sockerlönn); zuckerahornbaum; suikerahorn; erable à sucre; sugar maple.
Acer spicatum Lamarck.—Brandblade; bois d'orignal (elk fed on it), bois noir (northern New York).
Acer negundo L.—Hvit (vit) ask; witte esch; ash-leaved maple, white ash (New Jersey).

SAPINDACEAE

Cardiospermum halicababum L.—Capsicum ind[ic]um, cor ind[ic]um; piment (in cultivation, New York).

VITACEAE

Parthenocissus quinquefolia L.—Fünfblätteriger epheu; vyfbladig klimop; vigne vierge.

Vitis labrusca L.—Vild vinranka; wilde weinranke; poeldruif, vosseldruif (vossendruif); fox grape, marsh grape.

TILIACEAE

Tilia americana L.—Amerikansk lind; linde; bois blanc (Quebec), tilleul d'Amérique.

HYPERICACEAE

Sarothra gentianoides L.—Millepertuis-en-blanc.

THYMELEACEAE

Dirca palustris L.—Musträ; lederhout, loodhout; bois cuir, bois de plomb (French Canada); leaden-wood, leatherwood (Albany), moosewood. Several names based on the erroneous supposition that musträ means mouse tree are omitted.

ELAEAGNACEAE

Shepherdia canadensis L.—Bois à perdrix (Quebec; partridges, *i.e.*, ruffed grouse, eat the berries).

ONAGRACEAE

Circaea alpina L.—Stephanskraut; herbe de St. Etienne, herbe des magiciennes; mountain enchanter's nightshade.

ARALIACEAE

Aralia racemosa L.—Indian root.

Panax quinquefolium L.—Ginzeng; gin-seng (French Canada); garangtoging (an Iroquois name referring to a fancied likeliness in form of the root to a child); orhota (Tatar-manchu name meaning the queen); Canada ginseng.

AMMIACEAE

Deringa canadensis L.—Wilde kervel; berle, cerfeuil sauvage (French Canada; Hudson Valley, N. Y.), sison aromatique.

CORNACEAE

Cornus florida L.—Hundträ (träd); blühender kornelkirschenbaum, hellblumiger kornelkirschenbaum; cornouillier; dogwood.

Cornus "alternifolia L."—Bois de calumet (Lake Champlain; stems with pith punched out were used for pipes).

Cornus "stolonifera Michaux.—Rödvidja; rod (roode) kornoeljeboom; bois punais, bois rouge (Lake Champlain); red cornelian cherry.

Nyssa sylvatica Marsh.—Fiskträ (träd), fiskarträ (träd); fischerbaum; arbre poisson, tupelo velu.

ERICACEAE

Azalea nudiflora L.—Maj-blomster; Mayblume; Maibloem, Pinxterbloem (Pinksterbloem); American upright honeysuckle, may-flower, Pinxterflower, Whitsunday flower, wild honeysuckle.

Kalmia angustifolia L.—Dwarf laurel (New York).

Kalmia latifolia L.—Skedträ (träd); löffelbaum; lepelboom; arbre à cuillère, laurier, laurier nain d'Amérique; American dwarf laurel, laurel, spoon tree.

Kalmia glauca Aiton—Swamp laurel.

Epigaea repens L.—Krypande ground-laurel; kruipende grondlaurier; creeping ground-laurel, ground-laurel, May-flower.
Arctostaphylos uva-ursi L.—Mjölonris; mehlbeere; raisin d'ours; sagackhomi (an Indian term widely used by the whites; leaves of the plant were mixed with smoking tobacco); bearberry.
Chiogenes hispidula L.—Thébuske; grains de perdrix (Quebec); creeping snowberry; moxie plum, tea-bush.
Vaccinium oxycoccus L.—Amerikanskt tranbär; airelle d'A9mérique, canneberge, atopa (atocas, a name borrowed from the Indians. French Canada); American cranberry.

PRIMULACEAE

Glaux maritima L.—Herbe-à-lait; sea milkwort.

EBENACEAE

Diospyros virginiana L.—Mispel-trä (träd), persimon-trä (träd); mispelbaum; mispelboom; plaqueminier de Virginie; persimmon.

APOCYNACEAE

Apocynum androsaemifolium L.—Vloikruid (vlookruid); herbe à la puce (Hudson Valley, N. Y.; French Canada).
Apocynum "cannabinum L."—Vild hampa; hundstohles; wild hennep; Indian hemp.

ASCLEPIADACEAE

Asclepias syriaca L.—Katoenplant; cotonnier (Hudson Valley, N. Y.; French Canada).

LABIATAE

Prunella vulgaris L.—Braunelle.
Monarda didyma L.—Monarde rouge.
Hedeoma pulegioides L.—Faux-pouliot; penny royal.
Collinsonia canadensis L.—Pferdekraut; paardekruid; herbe à chevaux; horse balm, horse weed. ("Horses eat it in spring before any other plant comes up." New York.)

SOLANACEAE

Datura stramonium L.—Stechapfelbaum; pomme-épineuse, stramone; thorn apple.

SCROPHULARIACEAE

Verbascum thapsus L.—Vild tobak; grosses weisses wollkraut, tabak der wilden; grote (groot) wit wolkruid; bouillon-blanc, grande molène blanche, molène commune, tabac Indien, tabac des sauvages; great mullein, great white mullein, Indian tobacco, wild tobacco.
Linaria canadensis L.—Orant von Canada.
Digitalis purpurea L.—Purpurfarbenes fingerhutkraut; gant-de-Notre Dame.

PLANTAGINACEAE

Plantago major L.—Ängländars fot, grodblad; wegerich; Engelschman's voet, weegbree; pied d'anglais; broad plantain, Englishman's foot.
Plantago maritima L.—Zeeweegbree.

RUBIACEAE

Galium tinctorium L.—Meyerkraut; tisavoyanne rouge (French Canada).
Cephalanthus occidentalis L.—Bois-bouton.

CAPRIFOLIACEAE

Linnaea americana Forbes.—Campanule.
Sambucus canadensis L.—Amerikansk fläder; abendländischer holunder, Amerikanischer holunderbaum, Canadischer flieder; Amerikaansche vlier-

boom, Kanadaasche vlierboom; sureau blanc d'Amérique; American elder, Canada elder.
Viburnum opulus L.—Lingon (Canada).

LOBELIACEAE

Lobelia inflata L.—Tabac Indien.

COMPOSITAE

Anaphalis margaritacea L.—Immerwarendes leben, wiesenwolle; euwige (eeuwig) leven; immortelle; life everlasting.
Helianthus annuus L.—Sonnenblume; zonnebloem; soleil.
Bidens "bipinnata L."—Spanska nädar (nålar); Spanische nadeln; Spaansche netels (this means "nettles," the word for "needles" is naalden); Spanish needles (all in plural form).
Achillea millefolium L.—Schafgarbe, tausendblatt; herbe à dinde, millefeuille commune.
Arctium lappa L.—Karborrar; klette; kliffenkruid; bardane.

CICHORIACEAE

Leontodon taraxacum L.—Pfaffenblatt; gemene (gemeene) paardebloem; dent-de-lion commune, pissenlit.

WASHINGTON, D. C.
U. S. DEPT. OF THE INTERIOR,

LOCAL FLORA NOTES

A NEW STATION FOR CETRARIA ISLANDICA

The distribution of the "Iceland Moss" lichen, *Cetraria islandica* in the range of the Torrey Botanical Club was summarized by the late Raymond H. Torrey in Torreya **37**: 124–125, 1937. An additional large colony of this interesting lichen was discovered on the Torrey Club field trip of May 4, 1941. While climbing the sides of Sugarloaf Mountain near Chester, New York, Dr. M. L. Massey picked up a specimen and brought it to the leader's attention. Further search of the hillside led to discovery of a very large colony of the *Cetraria islandica* on the southwest exposure. The lichen is growing on sandy soil in open pitch pine and chestnut oak forest. The plants are very luxuriant, with broad lobes, and resemble those from the colony at Montague, New Jersey. A considerable area is covered by the lichen, but the colony is not easily found as it is to the southwest and off the trail which is used in climbing the south face of the mountain. A specimen has been deposited in the herbarium of the New York Botanical Garden.

JOHN W. THOMSON, JR.

The Variations of Sagittaria subulata

Robert T. Clausen

The phase of *Sagittaria subulata* which occurs in shallow pools in west-central Florida and elsewhere on the southern coastal plain is considerably different from the plant of tidal shores in the northeastern states. The southern plant is larger and often more robust; it also tends to have ovate-elliptical foliage blades. I have distributed specimens of this from Citrus County, Florida, under a manuscript name which now requires validation.

As here interpreted, *S. subulata* comprises two subspecies which are markedly ecologically correlated and somewhat geographically distinguished. These differ as follows:

A. Plants small, 3–15 cm. high, or very slender and elongate; phyllodia not blade-bearing, in the typical condition usually less than 10 cm. long and always less than 0.3 cm. wide; beaks of achenes 0.3–0.4 mm. long.....*S. subulata* ssp. *typica*

AA. Plants large, often robust, 10–45 cm. or more high; phyllodia 10–40 cm. or more long and 0.3–1 cm. wide, either without or with ovate-elliptical blades; beaks of achenes 0.2 mm. long..... *S. subulata* ssp. *lorata*

S. subulata (L.) Buchenau, ssp. *typica* (*Alisma subulata* L., Sp. Pl. **1:** 343. 1753). This is a plant of tidal mud flats, ranging from Massachusetts south to northern Florida. The var. *gracillima* (Wats.) J. G. Smith seems to be a slender, elongate phase which occasionally occurs in deep water.

S. subulata ssp. ***lorata*** (Chapm.) comb. nov. (*S. natans* Michx., Fl. Bor. Am. **2:** 190. 1803 (not Pall., 1776); *S. natans* var. *lorata* Chapman, Fl. So. U. S. 449. 1860; *S. subulata natans* (Michx.) J. G. Smith, N. Am. Sp. Sagittaria and Lophotocarpus, 18. 1894; *S. lorata* (Chapm.) Small, No. Am. Fl. **17:** 52. 1909; *S. stagnorum* Small, Man. Southeast. Fl. 24. 1933; *S. subulata* var. *lorata* (Chapm.) Fernald, Rhodora **42:** 409. 1940).

According to Small (1933), the achenes of the plants which he designated as *S. stagnorum* and *S. lorata* are larger, while the beaks of the achenes are shorter than in *S. subulata*. In the achenes measured by me, the beaks were 0.2 mm. long in ssp. *lorata* and 0.3–0.4 mm. in ssp. *typica*. In considering *S. subulata, S. natans* and *S. lorata* to be conspecific, the opinion expressed here concurs

with that of Fernald (1940). The vars. *natans* and *lorata* are now placed together because they seem to be phases of a more robust southern subspecies in which the leaves may be either with or without blades. The widely distributed collection of *A. H. Curtiss,* no. *6536,* from a shallow stream near Jacksonville, Florida, affords a good example of specimens intermediate between vars. *natans* and *lorata.* In this collection, some of the leaves on the same plants are blade-bearing, while others are long and ribbon-like, rather abruptly tapering at the tips. Since plants with blades occur in the same region and even in the same habitats as those without blades, and since the degree of stoutness appears not to be correlated with the presence or absence of blades, there seems little basis for separating these populations. Observation of a series of specimens in the herbaria at Cornell University indicates complete intergradation without geographic, ecologic or genetic barriers.

The ssp. *lorata* is a plant of pools and streams in Florida and coastal Georgia and South Carolina. As var. *natans,* Fernald (l. c.) reports it occurring as far north as southeastern Virginia.

Literature Cited

Fernald, M. L. 1940. *Sagittaria subulata,* in A century of additions to the flora of Virginia. Rhodora 42: 407–409.

Small, J. K. 1933. *Sagittaria,* in Manual of the southeastern flora. p. 22–26.

Bailey Hortorium,
Cornell University,
Ithaca, N. Y.

Chile Tarweed East of the Mississippi

Harold N. Moldenke

A glance through the various current manuals of the flora of North America east of the Rocky Mountains soon shows that the Chile Tarweed (*Madia sativa* Molina) is not recorded in Britton and Brown's "Illustrated Flora of the Northern United States," the seventh edition of Gray's "New Manual of Botany," Small's "Manual of the Southeastern Flora," or Rydberg's "Flora of the Prairies and Plains of Central North America." We must go to the manuals of far western botany to find it recorded and de-

scribed. Jepson in his "Manual of the Flowering Plants of California," pages 1097 and 1098 (1925), states that it occurs along waysides and in vacant lots of towns and villages, valleys and low hills in California, common in the Coast Ranges and coastal southern California, less common in the Sierra Nevada foothills, "doubtless naturalized from Chile." He records var. *congesta* (Nutt.) T. & G. from waste places and fields in western California and Oregon.

Recently E. J. Alexander in his "Southern plant notes"[1] has reported finding this plant near Rainbow Springs, Macon County, North Carolina, on August 19, 1939. He adds "Obviously introduced. The plant has not been reported before from the eastern states."

In the Britton Herbarium at the New York Botanical Garden there is a specimen of *Madia sativa* subsp. *capitata* (Nutt.) Piper [var. *congesta* of Jepson] collected by R. M. Harper in a weedy place in back of the chemistry building, University campus, Tuscaloosa, Tuscaloosa County, Alabama (*R. M. Harper 3687*). Dr. Harper has appended these interesting notes to the label "This has appeared here (and also at Macon, Bibb County, Georgia, and at Tallahassee, Leon County, Florida) in several recent years, but only a few specimens have been seen in any one year, and those usually on lawns, where their existence is rather precarious."

On July 14, 1940, Joseph Monachino found *M. sativa* subsp. *capitata* "fairly well represented and seemingly happy in a weedy habitat by a roadside" in the World's Fair region, Queens County, New York (*H. N. Moldenke 11585*). Specimens to back this record are deposited in the Britton Herbarium and the herbarium of the Botaniska Trädgard at Göteborg.

On June 22, 1941, Miss Alma Ericson and the present writer found subsp. *capitata* along the dirt shoulder of the highway about one mile north of Amityville, Suffolk County, New York (*H. N. Moldenke 11566*). The plants seemed quite well established and occurred regularly at the far edge of the shoulders (where they were not mowed down) for a distance of a mile or more. They were quite conspicuous, even from a fast-moving car, with a stout simple stem, 1½ to 2½ feet tall, and numerous capitate-congested heads of yellow flowers appressed close to the stem. The stems and herbage are

[1] Castanea **5**: 92. 1940.

very densely viscid-glandular. Herbarium vouchers are deposited in the Britton Herbarium and in ten other herbaria.

New York Botanical Garden.

Weed Records for the Great Basin

Bassett Maguire

The following collections constitute interesting records of weeds recently introduced into Utah and Nevada. These names do not appear in the manuals, nor does the literature assign these plants to Utah or the Intermountain region except in the instances noted.

Digitaria sanguinalis (L.) Scop., lawn weed, front Animal Science Building, U. S. A. C. campus, Logan, Utah, September 1, 1939, *Maguire,* no. 20372.

The crab grasses long known in Utah by the troublesome lawn weed, *D. Ischaemum,* are now represented also by the above species, apparently not previously reported from the state.

Cyperus esculentus L., weed in cultivated ground, Moab, Grand County, Utah, May 15, 1939, *J. F. Parrish;* weed along ditch banks and in cultivated fields, vicinity Moab, Grand County, Utah, September, 1939, *J. F. Parrish.*

Hitherto unreported from Utah. Recently introduced into cultivated areas at Moab and vicinity, this troublesome weed has now spread into Salt Lake and Utah Counties. It is here reportedly spreading rapidly in irrigated lands and possibly will become of grave importance.

**Halogeton glomeratus*[1] (M. Bieb.) C. A. Mey. ex Ledeb., roadside weed resembling *Salsola,* vicinity Wells, Elko County, Nevada, September 29, 1938, *Howard Passey;* weed, Bull Camp, Elk Mountains, Humboldt National Forest, Elko County, Nevada, June 11, 1939, *Maguire,* no. 17043. A. H. Holmgren, student of the flora

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[1] For further discussion of the occurrence of this species in Nevada, see Morton, C. V. A note on Halogeton, Leaflets West. Bot. 3, April, 1941.

* Duplicates of the cited specimens were identified by Mr. C. V. Morton of the United States National Herbarium.

of northeastern Nevada, reports this Chenopod to be widely distributed in the area, showing a wide tolerance of habitat. It occurs prominently in alkali areas associated with *Sarcobatus,* or equally successfully on more remote sage or browse slopes to an altitude of 7500 feet.

Roemeria refracta (Stev.) DC., weed in grain fields, becoming abundant, 1 mile east of Beaver Dam, Box Elder County, Utah, June 6, 1936, *Maguire,* no. 13684; along road side, Beaver Dam, Box Elder County, Utah, June 23, 1936, *A. D. Smith,* no. 171.

Not known to be cultivated in our area, this attractive poppy from the Near East, makes a colorful show in the dry-land grain fields in the vicinity of Beaver Dam, where also it is extensively established as a roadside weed. Its general spread may be expected. Apparently there are no records for the spontaneous occurrence of this plant from any other part of the country.

Euclidium syriacum (L.) R. Br., weed, locally but abundantly established along highway U. S. 50, 25 miles south of Salt Lake City, Utah County, Utah, May 11, 1940, *Maguire,* no. 18364.

This recently introduced annual weed, a native of Central Europe, was identified by Dr. R. T. Clausen, through whose hands had passed the earlier (the first from the United States) collection, from Washington, of Dr. W. C. Muenscher.[2] The above collection is thus apparently the second known from the entire country.

Euphorbia Esula L., *Leafy spurge,* weed, vicinity of Heber, Wasatch County Utah, May 23, 1939, *J. J. Bernard;* weed, vicinity Richfield, Sevier County, Utah, May, 1937, *H. W. Gore.*

During the past few years this troublesome weed has become so generally and commonly spread throughout the state that it is rapidly becoming one of the most troublesome pests. It seems not yet to be in the literature as occurring in Utah.

Ranunculus testiculatus Chantz, weed in sheep bed grounds, vicinity Ephriam, Sanpete County, Utah, August 7, 1940, *Maguire,* no. 19983. Attention was called to this annual "bur-weed" by O. W. Nielson, Sanpete County, weed supervisor. He well takes the position that it may become a weed of considerable importance, occurring as it does on sheep bed grounds, since the "burs" are

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[2] Muenscher, W. C. Notes on Washington plants. Torreya **40**: 167. 1940.

exceedingly difficult to remove from wool. This weed has recently been reported[3] from Salt Lake and Millard Counties, Utah.

INTERMOUNTAIN HERBARIUM,
UTAH STATE AGRICULTURAL COLLEGE, LOGAN, UTAH

Some Effects of Cold on Plants in Alabama in 1940

ROLAND M. HARPER

The winter of 1939-40 was the coldest for many years in Alabama. The average temperature for fifty-three stations, scattered over the state, was 12.2° below normal in January, 3.0° below in February, 0.6° in March, and 1.1° in April. At Tuscaloosa the mean temperature for January was 32.9° F., as compared with a normal of 45.1°. About six inches of snow fell the night of the 22nd, and it covered the ground completely for about a week, and partly for another week. In Pickens, the next county on the west, which in most winters has no snow at all, nearly two feet of snow was reported in some places. Temperatures below zero Fahrenheit were reported in Tuscaloosa on several consecutive nights during the week that the ground was covered with snow. Although the mean temperatures for February, March and April were only a little below normal, there was a killing frost nearly throughout the state on the night of April 12-13.

The first noticeable effect of cold on plants in Tuscaloosa in 1940 was frost ribbons issuing from the base of a cultivated shrub, apparently *Lantana Camara,* on the morning of January 2. I had published a few notes on this phenomenon (the latest in TORREYA for February, 1938), but had no record of its occurrence on a woody plant before, unless the splitting off of the bark of orange trees in Florida in severe freezes is caused by such ice formation. The *Lantana* is not hardy in Tuscaloosa, where it dies down to the ground every winter, and usually comes up from the roots again in the spring. But that cold spell seems to have killed it completely, and I have seen none here since.

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[3] Cottam, W. P., Garrett, A. O., and Harrison, B. F. New and extended ranges for Utah plants. Utah Univ. Bul. 30:7. 1940.

Penfound and Mackaness, in the Spring 1940 issue of the Louisiana Conservation Review, discussed the damage to exotic woody plants in and around New Orleans by the freezing weather of late January, and gave long lists of species moderately or severely injured, with half-tone illustrations of some of them after the freeze. The lowest temperature of that month in New Orleans was 20° F., on the 19th (several days before the zero weather in Tuscaloosa), but the monthly average was nearly as low as in Tuscaloosa, namely, 34.9°, or 20° below normal. Although the cold was not nearly as extreme in New Orleans, it did much more damage there than in Tuscaloosa, on account of the large number of semi-tropical plants cultivated there that can stand very little frost.

The principal effect of the late January cold on native plants in and around Tuscaloosa was to delay the blooming of *Alnus* and *Ulmus* about a month, and of the oaks about two weeks. This had a curious effect on *Quercus laurifolia,* which is fairly common on sandy banks of streams in the southern half of Alabama, and is also cultivated for shade. It is essentially evergreen, but usually drops most of its old leaves about the time its flowers and new leaves appear, in March. But in 1940 the old leaves dropped at about the usual time, and the new foliage was delayed by the cold, so that the tree looked surprisingly bare for a time.[1]

Cultivated plants in Tuscaloosa suffered more, for some people are always trying to cultivate tender plants as far north as possible, and severe winters naturally give them a setback. I made no careful notes at the time, but the following observations were jotted down a few weeks later, and pertain mostly to the University campus. *Aleurites* (tung oil tree) and *Pittosporum Tobira* seem to have been killed completely. *Cinnamomum Camphora, Feijoa Sellowiana* (a small Myrtaceous tree from South America), *Millettia reticulata* (an evergreen leguminous vine from eastern Asia), and one or more species of *Ligustrum* were killed to the ground, and did not recover sufficiently to bloom that year. *Eriobotrya Japonica*

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[1] Spring was late here in 1941 also, not because of any extreme cold, but on account of prolonged cool weather; and the oaks were again about two weeks late in blooming. But it seems that the leaves of *Quercus laurifolia* which were two weeks late in starting in 1940 hung on for a full year anyway, so that they lasted until flowering time in 1941. This point will be discussed more farther on.

(loquat) was badly nipped, and lost some of its branches, but bloomed again the following winter as usual. (It never makes any fruit here, as it does in Florida.) But curiously enough, *Elaeagnus pungens,* which Penfound and Mackaness reported as injured by the 20° temperature in New Orleans, did not seem to suffer noticeably from the zero weather in Tuscaloosa.

The frost of April 12-13, with a minimum recorded temperature of 26° at Tuscaloosa, came when the leaves of most of our deciduous trees were about half grown, and some of them were in bloom. The following morning I went about ten miles up the Warrior River, and found the leaves of all species of *Hicoria, Quercus* and *Fraxinus* frozen and wilted; even *Quercus montana,* which grows as far north as Massachusetts. The same thing happened to the leaves of *Magnolia macrophylla* on the campus, and doubtless in the woods too. But herbaceous plants seemed to be almost uninjured, except for a few with very delicate foliage, such as *Osmorrhiza* (*Washingtonia*).

Other effects of this same killing frost became apparent later in the year. It destroyed the fruit crop on all or nearly all the *Hicoria,* annual-fruited *Quercus, Vitis, Diospyros,* and cultivated pecans and peaches in the northern half of Alabama. But in Autauga County, near the center of the state, which I visited in late summer, the pecans, muscadines and persimmons seem to have borne a normal crop, or nearly so.

Some other effects of the cold winter did not become evident until fall. It seems that the falling of deciduous leaves is due not only to decreasing temperatures in the fall, but also to the accumulation of mineral salts in them, which the tree gets rid of and returns to the soil in that way.[2] It is doubtless largely for this reason that evergreens are characteristic of poor soils and cold and dry climates; and on very poor soils the leaves of trees may last two or more years before they get so impregnated with mineral matter that their usefulness is ended.

The trees around Tuscaloosa got such a late start in 1940 that by the second week in November most of the deciduous leaves had not yet matured sufficiently to form the abscission layer at the base of the petiole, which detaches them from the stem. So a severe

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[2] See Am. Fern Journal, **9**: 100. 1920.

frost the night of the 15th-16th caught many of them still green, and caused them to wilt and hang down much as a late spring frost would. And there they hung until about a week later, when a rain added enough weight to bring most of them down.

This was especially noticeable in *Ginkgo, Celtis, Broussonetia, Platanus, Magnolia macrophylla, Liquidambar, Albizzia, Acer saccharinum, Hibiscus Syriacus, Melia* and *Lagerstroemia,* all cultivated in Tuscaloosa, some native and some exotic. I did not have a good opportunity to go out in the woods at that time to see how the wild trees were affected.

In this connection it seems worth while to digress and note another instance of the duration of leaves being determined by age, in which temperature did not seem to be a factor. On and near the University campus there are a few young specimens of *Quercus lobata,* the California white oak, from seeds I planted in the winters of 1936-37 and 1937-38. The largest of these in the middle of 1940 was about five feet tall. In its native haunts in California it gets no rain in summer, and presumably makes very little growth at that season. But July, 1940, was unusually rainy in Tuscaloosa, with 12.55 inches of rain instead of the normal of 5.21, and the little tree added about a foot to its height during that month.

In November it dropped its leaves, like other deciduous trees, except on the uppermost foot, where the leaves had not yet served their time, so to speak. A photograph of it taken on December 18 showed the young terminal shoot still leafy and the rest of the tree bare. After that these last and youngest leaves dropped gradually, but the uppermost and youngest one hung on until about February 1, when it was about six months old, which is the approximate normal duration of deciduous leaves in this climate.

University, Ala.

Conservation: The Long View

Conservation of Renewable Natural Resources. A symposium by twelve authors. The University of Pennsylvania Press, Philadelphia. Pp. 200. 1941. $2.50.

This interesting and important volume is divided into three sections, the first being: "The natural vegetation of the United States as a guide to current agricultural and forestry practice." Following a few introductory paragraphs by Raphael Zon, we wade into the problem. Gustaf A. Pearson discusses "What forest trees tell about climate and soil," and Homer L. Shantz discourses on "The original desert shrub vegetation of the United States as a guide to present-day agricultural practice." These two, as we might expect, are excellent journeyman accounts of the problem, even if somewhat static in their viewpoint. It remains for William S. Cooper, the ecologist, to approach the problem in a dynamic manner in his "Man's use and abuse of native vegetation: the lessons of the past and the prospects for the future."

The second section, "Climatic cycles in relation to the theory and practice of conservation," has its quartet of authors. A. E. Douglass, as one would imagine, gives a rather lengthy discussion of "Dendrochronology and the studies in 'Cyclics.'" It is perhaps overburdened with methods, but is a good review of this work. The chapter by Charles G. Abbot on "Periodicities in solar variation reflected in weather," while brief, reiterates our knowledge that "weather" does come in cycles of varying length. Paul B. Sears, under the topic of "Conservation and changing environment," emphasizes perhaps as much as any of the authors that if man is to control his environment, if he is to hold the soil at a necessary level of productivity, he must first learn to control the greatest despoiler of the land—man himself. But he further points out that agricultural activities, even under the best of conditions, introduce a chain of events which make the necessary conservation of soil very difficult.

The closing chapter of this section, "Climatic pulsations and an ozone hypothesis of libraries and history," is by Ellsworth Huntington. Although the major portion of the chapter is taken up with an exposition of his "ozone hypothesis," proving only that

peoples of the higher latitudes are more stimulated and intellectually energetic than those of lower latitudes due to a periodically greater amount of atmospheric ozone, the disjointed first part is a restatement of his well-known and certainly obvious contention that movements of population must follow the great pulsations of climate. Perhaps being more a geographer than a prophet, Huntington has not asked but has answered the question: If the climate of an agricultural region changes, so that it no longer is able to support a large population, what are the people living there going to do about it? In the previous chapter, and anticipating Huntington, Sears intimates that much of the present wasteland in areas once heavily populated can be blamed on the unwillingness of the people to practice adequate methods of conservation—that a fertile land is soon laid waste by incorrect cropping methods. It is the opinion of this reviewer, based on his own observations in submarginal agricultural regions, that both forces—sometimes working concurrently—have been operative in the deterioration of agricultural land.

The last section of the volume is entitled "The administrative task of conservation—private and public." Again, four topics are discussed. These are: "On total conservation" by Morris L. Cooke; "Natural resources and the States" by Samuel T. Dana; "Federal responsibility in total conservation" by Milton S. Eisenhower; and "The forest problem can be solved by increased production" by Julian F. McGowin.

McGowin, a commercial lumberman with a sympathetic view toward conservation—both from a social and business standpoint—takes the stand that we have adequate forest resources; that all we need to do is to put them to use. He follows this by a plea for more government direction of conservation, especially fire protection. Dana closes his discussion with the pointed question: "We readily spend billions of dollars to prevent our natural resources from falling into the hands of a foreign enemy. Have we not the vision to spend a far smaller amount in assuring their perpetuation in the ownership of our own people, with ample opportunity for individual initiative under a democratic system of government? Eisenhower, in his discussion, holds that the responsibility for conservation lies with the Federal Government, pointing out a thing which many individuals do not realize: that in the last several

decades the United States has shifted from a debtor to a creditor nation. This has vastly changed the economy of other nations and has forced us into a new economic program. This, then, requires a national viewpoint and its natural consequence, Federal control of resources.

Cooke, in his chapter on Total Conservation, presents some interesting tables showing just what erosion is costing the people of the United States per year. In 1940 alone, the cost was nearly four billion dollars, of which amount more than three-fourths can be laid to the "loss of plant food constituents and plant nutrients contained in three billion tons of eroded topsoil and subsoil." Viewing this alarming rate of loss of our fertile land, so necessary to basic agriculture, he says: "It has been estimated that the United States has only seventy-five to one hundred years to go as a virile nation unless brave remedial measures are set up. Our country has a fatal earth disease. It is actually bleeding to death through the erosion of its soils. The longer healing measures are delayed, the more difficult and problematical becomes the cure." He closes with the remark, "It is reassuring to know that the task of rehabilitation is probably not beyond our means and our power."

Frankly, this reviewer, even at the risk of being called a cynic, is forced to the view that, because of a deteriorating agriculture, America faces an uncertain future. We have already been too careless of the magnificent heritage of this land. We cannot return to the abundance of the past merely by a discussion of the problem. It will require a tightening of our belts, a uniting of the whole country to the job of holding on to what we have; it will take more than the passing of a law. It means that there must be a hardening of the will of all the people to the task ahead if democracy, as a way of life, is to exist at all in this, our land. In a democracy, this will to exist as free men is not up to the government, it is up to the people, who *are* the government.

W. H. Camp

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Genetics and Evolution

The Material Basis of Evolution. By Richard Goldschmidt. Yale University Press. 436 pp. 1940. $5.00.

For over two thousand years men have been considering the idea of evolution as an explanation of the origin of living things as they exist today. John M. Coulter (Science, 1926) divided the history of evolution into three periods: Speculative, to 1790; Observation and Inference, 1790-1900; and Experimental, 1900 to date. Each of these periods may be said to have made certain definite contributions to the progress of the whole concept. Through speculation men came to realize that there are only three or four conceivable explanations for existence of present-day living things, *viz.,* special creation, spontaneous generation, evolution, with the "cosmozoa" concept as a possible fourth. As more and more data were accumulated in the field of biology and in other sciences, it became obvious that only one of the four was susceptible of factual substantiation, and the speculative period ended when the purposeful assembling of supporting evidence for evolution began.

This second or inductive period reached its climax with the appearance of Darwin's "Origin of Species," when the overwhelming weight of all the facts obtained from the study of the distribution of living things in time and in space, from comparative anatomy, embryology, and the rest, combined to carry conviction as to the historicity of the evolutionary process. In the forty years which followed 1859, little more was accomplished in a fundamental way except through the addition of many more positive data, and the recognition that there was little if any evidence for which a negative interpretation could be given. It did become clear, however, that little was really settled as to the method of evolution. Attention was therefore focussed on the necessity for the experimental study of variation and inheritance as to the focal processes in any evolutionary change.

With Mendel's rediscovered experiments as a basis, the concentrated attack of many investigators, using many different organisms, especially in the fields of experimental breeding and cytology, have combined to unravel many problems. The reasons why offspring resemble or differ from their parents seem to have been pretty well elucidated. So complete has the solution of the problem of variation seemed to many of those who have grown up in

their biology during the development of genetics that this closely focussed picture of the details of variation has come to be regarded as furnishing an adequate explanation of the whole process of evolution.

However, for at least half this forty-year period of experimental study there have been those who have questioned, not the value or validity of genetics within its field, but its sufficiency as an explanation of the "origin of species," and even more, of its adequacy to account for the appearance and differentiation of the higher categories of classification. The significance of "gene mutations," the key processes from the geneticist's point of view, is discounted; the great majority of those reported are minute in degree and have no survival value, even for minor varieties, let alone for groups of specific rank.

In this period of challenge and examination of the bearing of "gene mutations" on evolution, Richard Goldschmidt has been a leading figure. A systematist who has studied the gypsy moth in its wide north temperate distribution, and a geneticist who has made contributions of recognized importance to our knowledge of the inheritance and expression of sex, he is convinced that "gene mutations" have no bearing on evolutionary changes beyond the grade of races, geographical varieties, and other categories below the grade of species. Such minor differentiation he classes as "microevolutionary" variation.

For the production of a new species, a "macroevolutionary" variation in the germ plasm is needed. He finds the genetic basis for such changes in the complete reorganization of chromosomes which he believes is accomplished by translocations, segmental interchanges, by which he believes not particulate variations are brought about but a whole nexus of changes. The resulting organisms would stand apart as completely differentiated new species. In his view, a chromosome is not to be regarded as a grouping of discrete genes, like separate beads on a string, but rather as a unified chemical entity in the nature of a long chain molecule. The complex of characteristics of a species arises from the pattern of the chromosomes taken as wholes. Change a few small loci in a chromosome and you have still the old pattern with minor variation ("gene mutations"), but reorganize and redistribute the chromosome parts and you have new "genetic molecules" and the pattern for a different species.

As to the validity of Goldschmidt's concepts, this reviewer does not attempt to pass judgment. It would appear that we are in a period of appraisal and evaluation of the significance of the many important contributions of modern genetics on the broader field of evolution. That many geneticists have been too ready to assume the complete sufficiency of genetics seems obvious. That a final solution will require a synthesis of many fields of evidence, paleontology, taxonomy, anatomy and embryology, as well as cytology and genetics, seem equally self-evident. Goldschmidt brings to bear a very extensive experience in more than one field; his discussion is stimulating and constructive.

R. C. Benedict

Brooklyn College and
Brooklyn Botanic Garden

FIELD TRIPS OF THE CLUB

Trip of June 29, 1941, to Quarry Lake

Nineteen members and guests were present on this trip, made possible again[1] through the kindness and courtesy of Mr. and Mrs. Nathan Straus, to whom, as well as to Mr. and Mrs. Ernest Hoelle, the Club is deeply indebted. Mr. Hoelle acted as co-leader and provided transportation. Mrs. Hoelle generously provided cooling drinks and refreshments during the heat of the day in a picnic setting.

Considerable time was devoted to touring the formal gardens, lawns, and borders, with their wealth of cultivated plant material brought in from all portions of the globe. Among the most interesting of the plants studied were *Salpiglossis sinuata, Syringa villosa, Campanula celtidifolia, Hypericum patulum* var. *henryi, Paeonia suffruticosa,* two species of *Browallia, Sedum acre, Negundo aceroides, Cobaea scandens, Heliopsis scabra* var. *zinniaeflora, Lunaria annua, Daphne mezereum, Centaurea americana,* and numerous species and varieties of *Chaenomeles, Lilium, Limonium,* and *Philadelphus.*

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[1] For report of our previous trip to Quarry Lake see Torreya 39:178–180.

Growing wild in the quarry was the trumpet honeysuckle (*Lonicera sempervirens*) and by the lake were common mugwort (*Artemisia vulgaris*), long-leaved stitchwort (*Alsine longifolia*), rough cinquefoil (*Potentilla monspeliensis*), and slender vetch (*Vicia tetrasperma*). Considerable comment was elicited by the astounding variation in the size and shape of the leaves and spikes of the large-bracted plantain (*Plantago aristata*), growing in very dry barren soil of open fields and roadsides. Showiest of the wild flowers seen was the rough-fruited cinquefoil (*Potentilla recta*), with its beautiful and perfectly heart-shaped sulphur-yellow petals. Growing as weeds in an old garden were six interesting members of the mustard family—the field cress (*Lepidium campestre*), wild peppergrass (*L. virginicum*), field penny-cress (*Thlaspi arvense*), common hedge-mustard (*Erysimum officinale* var. *leiocarpum*), yellow-rocket (*Campe barbarea*), and wild turnip (*Brassica campestris*). Giant-fruited cultivated hybrid raspberries and blackberries were sampled. In the woods we found the anise-scented goldenrod (*Solidago odora*), cow-wheat (*Melampyrum lineare*), and crosswort (*Lysimachia quadrifolia*) in abundance. A new experience for practically all members of the group was the sight of the flowers of New Zealand spinach (*Tetragonia expansa*).

H. N. Moldenke

Trip of July 26-27 to Doubletop Mountain

Ten members and friends of the Club met at the Iris cottage, Arkville, New York, on the afternoon of July 25. On Saturday the party drove ten miles along the Dry Brook road past Seager Post Office to the last stopping place and parked the cars. A trail along Dry Brook led to the 2,700-foot level which is about one mile from the top of the mountain.

Aconitum noveboracense was found growing along the stream from the 1,800-foot level to the headwaters of Dry Brook. Dry Brook may at times become dry at Arkville, but it is a very active stream at the upper heights, with many beautiful waterfalls and gorges. The aconites extend along both sides of the stream to the branch that arises east of Doubletop Mountain. Aconites have been found on the marshy ground on both the east and west sides of the mountain.

Only one stand of *Polemonium Van-Bruntiae* was found located near a small pond that empties into Dry Brook at the 2,200-foot level. General collections were made by several members.

On Sunday several members of the party drove along the Beaverkill to the Balsam Lake Club.

WM. J. BONISTEEL

TRIP TO MT. EVERETT, MASS., SEPTEMBER 6-7, 1941

Beautiful weather and a terrain of rich discovery at a year-time when summer is turning into autumn. The pity is that so many members of the Torrey Botanical Club miss a trip like this. It offers so much at a reasonable cost. Accommodations at the Hunt farmhouse are comfortable and the food Mrs. Hunt prepares for outdoor appetites is simply "epoch making."

Five persons were present. The leader, who has an amateur standing, was especially glad that Miss Rusk was one of us. Dr. Friedman, who is an entomologist, pointed out interesting facts in his field. For instance, we found a beautiful mahogany shelf bracket (*Polyporus lucidum*). Its mycelium had promoted the death of a good-sized hemlock—and the bracket in its turn was being devoured by beetles.

We took special interest in studying the beginnings of the fall foliage. The leaves of the hobblebush (*Viburnum alnifolium*), the wild-sarsaparilla (*Aralia nudicaulis*) and the blueberries (*Vaccinium pennsylvanicum*) attracted our attention for their intermediate conditions of brilliance. They illustrated how the anthocyanin reds begin at the outer edges of the leaves while green is maintained along the veins.

One plant that always attracts interest on this trip to the top of Mt. Everett is the three-toothed cinquefoil (*Potentilla tridentata*).

We noted that the season was more advanced than at the corresponding time a year ago. The blueberries, which we enjoyed eating last year, were all finished and we had to content ourselves with huckleberries.

RUTHERFORD PLATT

NEWS NOTES

John Burroughs Association Membership Drive: Only those nature lovers who recall the seventies and eighties realize the extent of our indebtedness to John Burroughs. He left us his works, they will always live, but he also left us Slabsides, the little cabin at West Park in which some of his books were written and in which his final years were passed. Aside from the expense of its annual meeting, with the award of the Burroughs Medal, the care of Slabsides is the Association's only major expense. The Association is calling on Burroughs' friends and followers for assistance in preserving our common heritage. Address: The American Museum of Natural History, 77th Street West, New York, N. Y.

The first awards of beach plum prizes by the Arnold Arboretum, Harvard University, were:

The James R. Jewett prize, this year amounting to $100.00, has been awarded by the Arnold Arboretum of Harvard University to Mrs. Wilfred O. White of Boston and Vineyard Haven, Massachusetts, in appreciation of her outstanding efforts during the past few years in fostering interest in our native beach plum. This prize, of which Mrs. White is the first recipient, is to be awarded annually, at least for the present, to individuals who have made significant contributions to the development of this native plant, or who, through the development of beach plum products may have made contributions of social significance.

The first award of the Vieno T. Johnson prize, amounting to $50.00, has been made to Mrs. Ina Snow of Truro, Massachusetts. Mrs. Snow has been greatly interested in beach plums over a period of years, has maintained records of her observations concerning their growth and fruiting habits, and has accomplished some experimental field work. She has written various articles regarding her observations and has most generously shared her accumulated information with others interested in the plant and in its products.

These two prizes were provided through the generosity and interest of James R. Jewett of Woods Hole, Massachusetts, professor of Arabic, emeritus, Harvard University, who in 1940 pre-

sented to the Arnold Arboretum a capital sum, the income of which may be used to provide two annual prizes, the objective being to stimulate interest in the development of the beach plum and other native and introduced species, and in the development of their products.

The special committee of award for 1941 consisted of Dr. E. D. Merrill, Dr. Karl Sax, and Dr. Donald Wyman, staff members of the Arnold Arboretum, Harvard University, Prof. Ray Koon, director of the Massachusetts State College Field Station at Waltham, and Mr. Bertram Tomlinson, Barnstable County agricultural agent, Barnstable, Massachusetts.

We have the following communication from Dr. Pissarev. Perhaps some of our readers can assist him. Sirs and dear colleagues. Would you kindly send me, at the following address, seeds of *Elymus condensatus,* which are necessary for my experiments with cereal breeding." Prof. Victor Pissarev, Institut des Cereales, Njemtschinowka, Moscow, U. S. S. R.

AWARD: **Augustin-Pyramus de Candolle:** A contest has been opened by the Society of Physical and Natural History of Geneva for the best unpublished monograph on a genus or family of plants.

No condition of nationality nor residence is required of the authors. However, members of the Society are not permitted to compete.

Manuscripts can be written in Latin, French, German, English or Italian. They must be sent before Dec. 31, 1943, to: President of the Society of Physical and Natural History, Athénée, Geneva.

The instability of present conditions do not permit the Committee to fix at this time the amount of the award. Former prizes have been about $200.

This prize cannot be divided. It can be decreased or not awarded, in the case where the submitted works be judged insufficient or not answering to the conditions stated in this notice.

The chosen paper remains the property of its author.

ALFRED LENDNER
President of the Society

Geneva, March 1941.

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TORREYA

A Bi-Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

WILLIAM J. BONISTEEL

John Torrey, 1796-1873

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Vol. 41 November-December, 1941 No. 6

Gametophytes of Equisetum Arvense L.

Edwin B. Matzke

(with four figures)

Gametophytes of various genera of the common ferns, Filicales, can be found without great difficulty in the field by searching in appropriate habitats—in moist shaded woodlands in proximity to mature sporophytes that discharge spores. Presumably the spores of *Equisetum,* the horsetail, often travel greater distances, and gametophytes are discovered very infrequently. The finding of large numbers of the prothallia of *E. arvense* under rather unusual circumstances, and a brief description of these gametophytes, therefore seem worthy of record.

Miss Walker (1921, 1931, 1937) has made exhaustive studies of the gametophytes of several species of *Equisetum* growing both under natural conditions and in culture. This work has thrown much light on the general nature of the gametophytes and especially on the sexual expression of the haploid generation. Miss Walker states that the finding of the gametophytes in nature "has been rare." A few specimens of *E. arvense* gametophytes were found by N. F. Petersen in 1917 at Osborn, Indiana (Walker 1921). Later Miss Walker (1931) found abundant material of this species at one other station, near Weeping Water, Nebraska, where the gametophytes occurred "on moist clay soil situated in a small bend in a creek." Miss Walker grew gametophytes of *Equisetum arvense* in culture, from spores, and studied the production of antheridia and archegonia in detail.

The same species has been studied and collected in the field in Europe in recent years by Mäckel (1924) and Schratz (1928), both of whom were interested in the sexual expression of the gametophytes. Small male prothallia were found in the field by Schratz but

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not by Mäckel. Miss Walker also obtained male plants of this species in culture. Careful examination of the prothallia of two other species of this genus has been made by Rumberg (1931), who gives an excellent review of the literature of the entire subject. Gametophytes of *E. debile* in India were investigated by Kashyap (1914, 1917), who states that a well-grown prothallium of this species may be as much as three centimeters in diameter; he figures one, natural size, of nearly two and one half centimeters. Small prothallia of this species, either male or female, were obtained under crowded conditions in culture by Kashyap.

Among the older accounts of the gametophytes of *Equisetum* may be mentioned the classical studies of Buchtien (1887), Sadebeck (1881), and Jeffrey (1899). Excellent reviews of the literature are given by Sadebeck (1900), Goebel (1930), Campbell (1930), Eames (1936), and Smith (1938).

Although it is not difficult to grow spores of *Equisetum* in culture, they have not been found under natural conditions very often. In spite of its wide distribution and common occurrence, this seems to be especially true of *E. arvense*. Eames (1936), for instance, states that gametophytes of this genus grow "on wet soil in shaded places," but that they "are rarely found in the wild." Smith (1938) states that they "are generally found growing on clayey soil and in the mud belt along the banks of streams."

At Orehill, Connecticut, a tiny hamlet between Lakeville, Connecticut, and Millerton, New York, there is a large open iron mine. According to local accounts, this mine was worked from about the year 1700 until shortly after the first World War. About 1920 the operations were discontinued, and this large pit, of numerous ramifications and varying depths, was left exposed. Water then collected within it and submerged and killed the plants that had become established at the base and part way up the slopes. Those plants that were growing on the sides of the excavation, above the level of the water of the lake thus formed, are still present.

In January, 1941, in preparation for using the iron deposits again, the emptying of the water from this pit by pumping was begun, and it was almost completed by the middle of June. This mine presented the rather unique spectacle, then, of an emptied lake, the bottom composed largely of clay and silt, and it was remarkably free of aquatic plants or their remains. The previous water level was

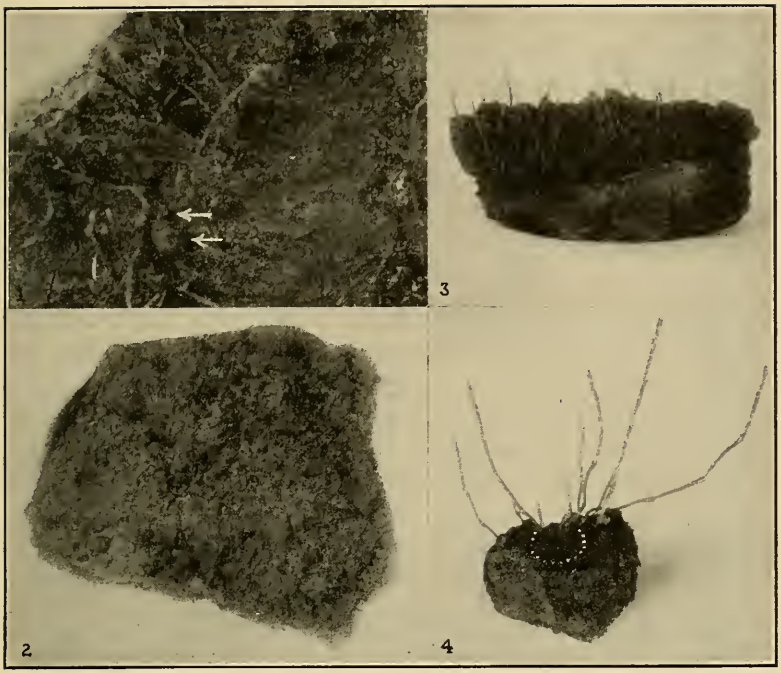

FIGURE 1. Gametophytes of *Equisetum arvense*. A large one, about 6 millimeters in diameter, is indicated with a white arrow; a smaller one beside it, dark in the photograph, is similarly indicated. Young sporophytes are also visible in the photograph. 5/6. FIGURE 2. Gametophytes of *E. arvense* of varying sizes, appearing as dark spots on the soil, some hardly visible, some several millimeters in diameter. 2/5. FIGURE 3. Young sporophytes of *E. arvense,* the gametophytes from which they originated visible at the base of some. 1/3. FIGURE 4. Gametophyte of *E. arvense,* in the white circle, bearing two sporophytes, each of which shows a primary and a secondary shoot. 5/6.

clearly and sharply delimited, and above this the steep slopes were completely occupied by plants. On the sides and bottom of the excavation, below the erstwhile water level, stood the gaunt remains of trees and shrubs that had been submerged, some presumably for two decades. At the former water level was a hydrosere, with cattails, sedges, alders, willows, etc., though the water was gone. Slightly above this former water level, mature sporophytes of *Equisetum arvense* were found growing in considerable abundance. Although strobili in this particular locality have not been studied,

this species sheds its spores in this general area in April, the last strobili discharging their contents in early May.

On June 18, 1941, Mr. Wallace Carr and the writer were studying the succession along the margins of this pit and were searching for indications of floating and submerged plants, without very much success. For the most part the recently exposed clay and silt were completely devoid of plant life. Since the removal of the water, the substratum is subject to alternate wetting and drying, and although the rain washes down over the sides and runs along the bottom of the pit, the base is not level, so that it collects in the deepest parts. The slopes are fairly steep, but the width of the pit is so great that there is little shading of the bottom, except in early morning and late afternoon. Consequently the fine soil at the base becomes alternately inundated in wet weather and more or less baked, though never completely so, in dry periods, cracking into characteristic "cakes." It was on this substratum that hundreds of gametophytes were found several hundred yards distant from mature sporophytes. Although the soil was distinctly cracked, it was not powdery and dusty, but firm enough to permit the removal of "chunks."

The gametophytes there on June 18 were very numerous and of varying sizes, some hardly visible, some about the size of a pin head, many somewhat larger, varying in diameter up to about six millimeters. They looked like hundreds of miniature green pincushions, many of them having young sporophytes that were just beginning to project visibly up into the air. Mostly they were a rather soft green in color, some were dark brownish green, while one, noticed several weeks later, was distinctly brownish red. The photographs in figures 1-4 were taken on July 8. The largest gametophyte, collected on July 19, was nearly circular in outline and measured 8 millimeters across. It bore no sporophytes, and like some of the other larger ones, had begun to break down slightly near the center. Even at that date, however, there were numerous gametophytes, without sporophytes, that were bright green and vigorous, though a larger number were disintegrating.

Some of the soil with the gametophytes was brought into the laboratory, where the prothallia were kept alive. They were more or less circular in outline, and somewhat raised in the center. One of the larger ones, about 6 mm. in diameter, is shown in figure 1;

beside it is a smaller one about 2 mm. in diameter, darker in color. Some young sporophytes are also shown in this photograph.

Upon dissection, the prothallia were seen to consist of a basal parenchymatous tissue, from the lower surface of which rhizoids developed. On the upper side of this tissue erect branches were produced, which above were variously lobed and fringed. This structure corresponds with that described by Miss Walker (1931) for the "normal thalli." She has taken up in detail the development and distribution of the archegonia and antheridia.

Miss Walker has also described male gametophytes in this species, growing under crowded conditions in culture, while Schratz (1928) found small male gametophytes, which early darkened and died, growing in the field. In the material found in Connecticut there were numerous small gametophytes, mostly brownish or black in color, which had died, though presumably not as a result of overcrowding. Whether or not these were strictly male was not established, though they seem to correspond with those described as male by Schratz. They did not bear sporophytes. They are visible as small dark sports in figure 2.

During the time that these plants were kept under observation in the field, the sporophytes developed considerably. On June 18 young sporophytes were visible, and one month later they were large and conspicuous, though some were still beginning growth at that time. Figure 3, taken on July 8, shows young sporophytes growing from the old gametophytes, some of which are visible. The gametophytes gradually died off, but on July 19 many could still be found, associated with the sporophytes or growing alone.

It was not uncommon for one gametophyte to bear more than one sporophyte. Miss Walker (1921) states that as many as eleven young sporophytes may begin development on one gametophyte in *E. laevigatum,* though not more than seven were found large enough to be visible to the naked eye. According to Kashyap (1914), *E. debile* gametophytes not uncommonly bear eight or ten sporophytes, and he figures one which he states had fifteen. In the material from Connecticut it was not uncommon to find several sporophytes originating on the same gametophyte. Figure 4 shows such a gametophyte, bearing two sporophytes, each of which is made up of a primary and a secondary shoot.

From an ecological standpoint, the gametophytes, and later the sporophytes, of *Equisetum arvense* took possession of this rather unusual habitat. A few scattered seedlings of angiospermous plants had also come in, mostly *Alisma Plantago-aquatica,* the water plantain, and some leafy moss plants and fern gametophytes had developed on this substratum. *Equisetum arvense* was by far the most common plant, however, and temporarily at least, it had actually taken possession of this bare area, having come in by means of its spores. This is a case, then, of *E. arvense* as a pioneer in a new, bare area. It is not impossible that the presence of iron in this soil may have favored the development of these gametophytes, though of course there is no evidence to support this.

Summary

Hundreds of gametophytes of *Equisetum arvense* L. were found in the wild during June, growing in an open iron mine pit which had been pumped free of water earlier in the year.

Some of the gametophytes were fairly large, as much as eight millimeters in diameter, more or less circular in outline, and green in color. Others were much smaller, some barely visible, and they were mostly brownish or black when they were found. These latter seem to correspond with the male gametophytes of this species found in the wild in Europe by Schratz.

The gametophytes consisted essentially of a lower parenchymatous tissue from which rhizoids grew into the soil and from the upper portion of which erect branches were developed which were variously fringed and lobed.

This is a case in which *Equisetum arvense,* by means of its spores, has come into a newly exposed bare area as a pioneer and is becoming established.

Columbia University
New York, N. Y.

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Distribution in Ontario of Dracocephalum thymiflorum [1]

Herbert Groh

A note by Prof. N. C. Fassett in Torreya 41 : 57. 1941, records the collection of *Dracocephalum thymiflorum* L. in 1938 from Manitoulin Island in the Province of Ontario, Canada, and refers to earlier stations in Massachusetts and Idaho.

Other Ontario records, unfortunately not published hitherto, should be added to that from Manitoulin. The plants sent were identified, and except the second which was returned to the Ontario Agricultural College, Guelph, Ont., have been retained in the herbarium of this division. They are from: Shelburne, Dufferin Co., John Leigh, June 4, 1931; Perth, Lanark Co., Peter Byrne, June 26, 1931; Berwick, Stormont Co., H. W. Graham, July, 1935. Mr. Graham, at the same time, had an unconfirmed report of it from near Williamsburg, Dundas Co., Ont.

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[1] Contribution No. 674 from the Division of Botany and Plant Pathology, Science Service, Dominion Department of Agriculture, Ottawa, Canada.

Enquiries directed to a few Ontario herbaria have failed to add to this list. Also, from enquiries made, it does not appear that any of these colonies have attracted further notice. In each case the possibility of spread had been pointed out, perhaps to good purpose.

Linnaeus' Rules of Nomenclature

A Chapter in the History of Plant Names

H. W. Rickett

In a modern textbook of botany we read the naïve assertion that "botanists began the use of Latin names in order to avoid confusion." Actually the use of Latin by scholars was a survival, not a beginning; a survival from times when Latin was the spoken language of the civilized world. It has not always avoided confusion. Botanists of the eighteenth century thought it strange to use names other than Latin, and Linnaeus habitually wrote in Latin to his scientific correspondents. This helps explain why we have had to wait 200 years for a translation into English of an important work by the father of botany.

The *Critica Botanica* of Linnaeus now appears in a translation by the late Sir Arthur Hort, revised by Miss M. L. Green, and published by the Ray Society. In 1736 Linnaeus produced his *Fundamenta Botanica,* a small volume in which he expounded the science of botany as he understood it; one of the earliest of textbooks. Chapters VII-IX contained, in 115 brief numbered paragraphs, his proposals for a system of nomenclature of plants, which should reduce the prevailing chaos to rational and orderly procedure. The following year, largely because of the opposition of other botanists to some of his suggestions, he published the 115 aphorisms with full discussions and exemplification; this was the *Critica.* The *Fundamenta* formed the basis of the *Philosophia Botanica* of 1751, in which the discussion of nomenclature was again condensed.

Though he later abandoned many of his own ideas, these earlier works by Linnaeus are of value in tracing the development of his thought and in illuminating the problems which he encountered. He here propounds the rules, so long taken for granted that it is now difficult to imagine the conditions that made them necessary, that

one genus should have but one name and that that name should consist of but one word. "Let every species of plant bear on its standard the name of its genus, which marks the regiment in which it serves." Many pages are devoted to the principles which should govern the creation of generic names. Linnaeus himself later disregarded many of these, as that "generic words compounded of two entire Latin words are scarcely to be tolerated," which would eliminate *Passiflora, Saxifraga, Sempervivum.* It is with a twinge of regret, hardened though we may be by the perversions of modern scientific jargon, that we read his strictures on hybrid names (compounded from roots of more than one tongue) "of which the philologists make violent complaint;" and against "ell-long words" (*verba sesquipedalia*), such as *Mesembryanthemum.* A faint foreshadowing of a list of *nomina conservanda* is to be seen in the admission that "generic names which have been bestowed without harm to Botany should, other things being equal, be allowed to pass."

Of all his comments on generic names the following, which sheds some light on Linnaeus' view of the stability of species, is perhaps the most interesting: "You may observe, they say, in *Hemerocallis* (for instance) that the root is exactly that of an Asphodel, and the flower exactly that of a Lily: is not then 'Lilio-asphodelus' an excellent name for it? No, I am sorry that I cannot see their point. . . . If there were such a thing as metamorphosis in plants, so that from one species could arise another belonging to a different genus . . . . such names would no doubt be excellent and admirably suited to such plants." If he had known of *Raphano-Brassica* his conclusion must have been different.

The specific names of this work are the so-called "polynomials" —descriptive phrases rather than names in the modern sense, expressing "the Differentia which is imprinted on the plant itself." Most of the argument is directed to the elucidation of the essential characters, those which may properly be considered to distinguish species. "The specific name has no description but is itself a diagnosis." Size, habitat, scent, taste must not be used in the specific name, but "only those characters . . . which are constant, certain and organic." He quotes from Sloan "an appalling diagnosis: *Arum summis labris degustantes mutos reddens*" (the arum which strikes dumb those who only just taste it; indeed an unfortunate choice of character for identification). The specific names

are to be wholly descriptive: "let the reproaches bestowed on plants disappear; we do not recognize that one plant is more 'true' than another, or 'spurious' or 'counterfeit' or 'peculiar.'" The characters used must be only those which distinguish the species of the same genus; and "a specific name without a generic name is like a bell without a clapper." A synoptic name "consists of the appropriate branches of a dichotomous key to all the species of a genus," while an essential name, which should replace the synoptic name when possible, "indicates a characteristic difference which is unique and exactly appropriate to that species only to which it is applied." Here and elsewhere we see that pursuit of brevity which finally led to the binomial system. The "synoptic" and "essential" diagnoses of species still characterize contrasting styles in the writing of manuals.

The adoption of the binomial system necessitated a revolution in Linnaeus' point of view between 1737 and 1753, the extent of which may be appreciated from the following: "Nothing is commoner than to take a part for the whole, and call a plant *alba,* which merely has white flowers. . . . But 'see yonder the evening-star; make haste, my kids, to the fold.' At length let the day of clouds come to an end, to be succeeded by a morrow of clear shining." In the effulgence of the new day *Saxifraga alba* was to be replaced by *Saxifraga corollis albis.*

There is no indication anywhere that a species can have but one valid name, and no principle of priority is possible for names that are diagnoses. Indeed "when we assign various synonyms to the same species, it is necessary that the first place should be allotted to the best synonym. . . . If it is decided that none of the synonyms is really suitable for the plant, then necessity compels us to make up a new one." With this we may contrast his attitude towards generic names: "New generic names are not to be coined, so long as suitable synonyms are available."

Linnaeus regarded it as a solemn duty to perpetuate the names of great botanists in generic names (though at this time he forbade it in specific names). Since in this he encountered lively opposition, he went to some trouble to justify it. "It is commonly believed that the name of a plant which is derived from that of a Botanist shows no connexion between the two. But anyone who has but slight knowledge of the history of letters will easily discover a link

by which to connect the name with the plant, and indeed there will be such charm in the association that it will never fade from his memory. I will set forth a few instances:

"*Bauhinia* has two-lobed leaves, or two as it were growing from the same base—being called after the noble pair of brothers, Bauhin.

"*Scheuchzeria* is grassy and alpine, being called after the famous pair of brothers, Scheuchzer, of whom the one was eminent for his knowledge of grasses, the other for his knowledge of alpine plants. . . .

"*Linnaea* was named by the celebrated Gronovius and is a plant of Lapland, lowly, insignificant, disregarded, flowering but for a brief space—from Linnaeus who resembles it."

Finally, lest our horticultural friends should take too much heart from Linnaeus' gibes at "ell-long," "difficult," and "unpleasant" names, let them note that he regarded (at this time) all varieties as monstrosities, and on horticultural names delivered himself as follows: "Botanists differ from florists in their conception of varieties in this respect: that the former bestow varietal names by way of defining and expressing in words some unique characteristic in the variety: and this seems to me a fitting proceeding: but the latter do reverence to the objects of their worship with names showing their devotion, lest anyone with unwashen hands should approach the mystery of their noble art."

What would he think today?

New York Botanical Garden
New York, N. Y.

An Unstable Dicentra

P. J. van Melle

In a number of gardens, including the Thompson Memorial Rock Garden of the New York Botanical Garden and the Lown Memorial Garden at Poughkeepsie, N. Y., *Dicentra oregana* Eastw. has become larger statured, less glaucous leaved, and pink-flowered, a condition in which it appears to be indistinguishable from *D. formosa*. This would seem sufficient grounds upon which to challenge the specific standing of *D. oregana*.

As introduced into cultivation from southern Oregon, this creamy-flowered, glaucous-foliaged plant called *D. oregana* is an undeniably charming thing, by no means easily established in Eastern gardens, where it is likely either to dwindle slowly or, if it "takes hold," to revert to the condition indicated above. Reports of "pink *D. oregana*" in Oregon and Washington gardens suggest that the reversion takes place in that part of the country as well. Examination of reverted material reveals no differential characters sufficient to distinguish it from the somewhat variable *D. formosa* for it has the spreading rhizome, the form of stigma, the short-spreading outer petals, the scarcely protruding inner ones, and flower color characteristic of this species. Since the plant known as *D. oregana* apparently reverts rather easily to *D. formosa* it appears, therefore, to be only a phase of this and not worthy of specific rank. The following nomenclature change is therefore suggested:

DICENTRA FORMOSA (Dryand.) Walp., forma ***oregana*** (Eastw.) van Melle, comb. nov.

Dicentra oregana Eastw. Proc. Cal. Acad. Sci. **20:** 144. 1931.

P. O. Box 1178.
POUGHKEEPSIE, N. Y.

An Introduced Ladysthumb from Asia

HAROLD N. MOLDENKE

During recent years a good bit of interest has been aroused among local botanists by the appearance and rapid spread of an Asiatic weed, the bristly ladysthumb, **Persicaria longiseta** (De Bruyn) Moldenke, comb. nov. [*Polygonum longisetum* De Bruyn in Miq., Pl. Jungh. 307. 1854]. As far as I am aware, it is not listed in any of our current manuals or local floras, although, as will be shown below, it has been in the country for at least thirty-one years. The first published record of its occurrence in America seems to be by Harger *et al.* in their "Additions to the flora of Connecticut" published in Bull. Conn. Geol. & Nat. Hist. Surv. **48:** 43 (1930). This was followed by a discussion by Dr. S. F. Blake entitled "*Polygonum caespitosum* var. *longisetum* in the United States" in

Rhodora **34:** 146–147 (1932), and another by Walter M. Benner in Bartonia **15:** 33 (1933). These published articles list about twenty localities in Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, and the District of Columbia, the earliest record being one from 1922.

Since this time many additional localities for the plant have been recorded by wide-awake collectors, so that now it is known definitely from at least eighty-eight places in the eastern states. A number of earlier records have also been discovered. Its rapid spread seems to indicate that it will soon be a very common weed in America. It seems desirable, therefore, to record fully at this time all that is known of its earliest history here, and to trace, if possible, the course of its spread year by year.

Persicaria longiseta seems to have been found first in America by Edwin B. Bartram (*no. 1312*) at Wayne, Delaware Co., Pa., on October 13, 1910. The second record is one by L. H. Lighthipe, who found it as an escape in the garden of Manda's at South Orange, Essex Co., N. J., on October 15, 1912. The next five records were made by W. C. Ferguson, who found it along roadsides at Garden City, Nassau Co., N. Y., on July 1, 1918; in woods at Plattsdale, N. Y., July 2, 1919; again at Garden City on August 16, 1920; along roadside and in a yard at Wading River, Suffolk Co., N. Y., June 21, 1922 (*no. 1462*); and again at Garden City on August 16, 1922, where he says it was already a common weed.

On July 12, 1924, H. E. Stone found it in moist ground of a gutter, Rosemont, Montgomery Co., Pa. On September 21, 1926, William Trimble collected it at West Chester, Chester Co., Pa., and on August 10, 1927, again along streets in West Chester. Dr. E. H. Eames, on October 7, 1927, found it on an old estate at Greenwich, Fairfield Co., Conn., and at several points in much disturbed property nearby. The same collector located a large colony in a moist shaded low spot near a house at Greenwich, Fairfield Co., Conn., on September 3, 1929.

In 1930 four more records were added. On September 6 H. E. Stone found it in a garden (presumably as a weed) on Washington Street, West Chester, Pa.; on September 18 E. H. Eames found another large colony along a shaded moist roadside at Greenwich, Conn.; on September 27 H. E. Stone collected it from a moist spot

in the serpentine barrens north of West Chester, Pa.; and on October 4 O. E. Jennings discovered it at Hartwick, Allegheny Co., Pa. The year 1931 brought a number of additional localities to light. Dr. S. F. Blake found the plant on August 16 (*no. 11379*) and September 6 (*no. 11398*) in five or more separate spots up to half a mile apart at Stoughton, Norfolk Co., Mass. On June 9 of that year Bayard Long found it on a dumping ground, Harrison Avenue near Mill Road, Elkins Park, Montgomery Co., Pa. (*no. 35249*). In October Dr. Jennings found it at Pittsburgh, Allegheny Co., Pa., and on November 1 S. F. Blake discovered two thriving colonies at Washington, D. C.—the southernmost station thus far recorded.

On July 19, 1932, E. H. Eames found it along the border of a gravel path, summit of West Rock, New Haven, New Haven Co., Conn. (*no. 11451*). On August 13 F. J. Hermann collected it in maple woods along the Delaware River, half a mile north of Riverton, Burlington Co., N. J. (*no. 3645*). W. M. Benner found it on the bank of a roadside ditch at Andalusia, Bucks Co., Pa., on September 24 (*no. 4655*), while on September 29 Dr. Eames found another small colony at New Haven. On October 30, 1932, Dr. Francis W. Pennell discovered it for the first time along a shaded, stony path on his place at Moylan, Delaware Co., Pa. (*no. 16135*).

From this point on the records begin to pile up rapidly. The following is a chronological listing of them:

1933: October 8—weed about garage, 6511 North 8th Street, Oak Lane, Philadelphia, Pa., *J. M. Fogg, Jr., 6227.*

1934: June 21—weedy waste off Burr Road, Bridgeport, Fairfield Co., Conn., *E. H. Eames 11621.*

September 16—in moist open lot on South Street, Morristown, Morris Co., N. J., *R. H. True 395.*

October 10—muddy bank along Newton Creek, Oaklyn, Camden Co., N. J., *B. Long 44957.*

October 20—border of Wissahickon Drive, Wissahickon Creek near Hartwell Avenue, Fairmount Park, Philadelphia Co., Pa., *B. Long 45118.*

October 30—woodland, Moylan, Delaware Co., Pa., *F. W. Pennell.*

1935: June 11—moist ground, down slope on Sharp and Dohme property, Glenolden, Delaware Co., Pa., *E. C. Earle 353.*

June 25—Glenolden, Delaware Co., Pa., *E. C. Earle.*

August 19—waste ground by University of Pennsylvania Botanical Garden near 36th and Spruce Streets, Philadelphia, Pa., *B. Long 47390.*

October 12—shaded roadside bank along Bryn Mawr Avenue, half a mile southwest of Bryn Mawr, Delaware Co., Pa., *J. M. Fogg, Jr., 10029.*

October 19—path through woods along Darby Creek, North Springfield, Delaware Co., Pa., *J. M. Fogg, Jr., 10064.*

1936: June 20—roadside, Glenloch Station (P. R. R.), Chester Co., Pa., *H. E. Stone.*

September 5—along street curbing, Albany, Albany Co., N. Y., *H. D. House 24068.*

September 5—common along east bank of Wissahickon Creek north of Bells Mill Road, Chestnut Hill, Philadelphia Co., Pa., *J. M. Fogg, Jr., 11369.*

September 22—Morristown, Morris Co., N. J., *R. H. True.*

September 29—waste ground along south side of Cherry Street east of 19th, Philadelphia, Pa., *W. M. Benner 7492.*

1937: July 6—4111 Bolt Avenue, West Philadelphia, Philadelphia Co., Pa., *R. H. True 4174.*

October 17—Wissahickon Creek and Westview Avenue, Chestnut Hill, Philadelphia Co., Pa., *J. M. Fogg, Jr., 11374.*

1938: September 15—Wyomissing, Berks Co., Pa., *Hans Wilkens 5692.*

October 9—under trees along the Wyomissing road, *H. Wilkens 5727.*

October 10—West Chester, Chester Co., Pa., *R. H. True 6542.*

October 14—Merion, Montgomery Co., Pa., *R. H. True 6542.*

1939: June 3—¾ of a mile west of Haverford Post Office, Delaware Co., Pa., *R. L. Schaeffer 1696.*

June 20—3 miles northeast of Liverpool, Perry Co., Pa., *F. R. Fosberg 16292.*

July 6—alluvial bank along Pleasant Run, within 1 mile northwest of Pleasant Run, Hunterdon Co., N. J., *W. M. Benner 8719.*

July 6—1 mile northwest of Pleasant Run, Hunterdon Co., N. J., *W. M. Benner 8718.*

July 15—South Queen Lane Station, Germantown, Philadelphia Co., Pa., *J. M. Fogg, Jr., 16266.*

September 2—on a moist grassy slope near Somerset, Mercer Co., N. J., *W. M. Benner 8954.*

September 4—along Musconetcong River above Warren Glen, Hunterdon Co., N. J., *B. Long 53845.*

September 6—grassy strip along sidewalk at Foulkrod and Harrocks Streets, Frankford, Philadelphia Co., Pa., *W. M. Benner 9060.*

September 20—half a mile southwest of Haverford, Montgomery Co., Pa., *R. L. Schaeffer 5633.*

October 8—alluvial woods along Schuylkill River, West Manayunk, Montgomery Co., Pa., *J. M. Fogg, Jr., 16423.*

October 8—one mile northwest of West Manayunk, Montgomery Co., Pa., *J. M. Fogg, Jr., 16480.*

1940: June 23—great masses in a moist ditch at the foot of a cliff paralleling the Hudson River in Palisades Interstate Park, Bergen Co., N. J., *H. N. Moldenke 11356.*

September 19—edge of field on Church Road, half mile northwest of Wynnewood Station, Montgomery Co., Pa., *E. Perot Walker 2271.*

October 3—open grassy roadside, ¾ of a mile west of Rowlandsville, Cecil Co., Md., *R. R. Tatnall 4702.*

1941: August 15—common as a weed on the grounds of the New York Botanical Garden, Bronx Park, Bronx Co., N. Y., *Joseph Monachino* [*H. N. Moldenke 11747*].

September 7—along a roadside at Seeley's Notch, Somerset Co., near Scotch Plains, N. J., *H. N. Moldenke 11793.*

September 9—grounds of the New York Botanical Garden, a common weed, Bronx Park, Bronx Co., N. Y., *Joseph Monachino* [*H. N. Moldenke 11811* and *11813,* the first-mentioned collection is of diseased plants].

Mr. Louis E. Hand, in a letter to me dated September 15, 1941, says: "my acquaintance with it [*Persicaria longiseta*] is rather local in scope, as I haven't seen it except within a relatively short distance of Philadelphia and in Bucks Co., Pa. It is fairly common in the city and suburbs. Mr. O. H. Brown, of Cape May, N. J., told me in August of this year that he just recently collected it in his county for the first time."

Persicaria longiseta is an annual species with nearly prostrate to erect stems, usually with a reddish-purple cast. The leaves are lanceolate to narrowly ovate, spotted or rather obscurely spotted in the middle, pellucid-punctate, short-petioled or subsessile, 5-12 cm. long. The spikes are slender, usually basally interrupted, rather deep pink in color. The achenes are smaller than those of any of the native species with which it could be confused, being only 1.8-2 mm. long, and are always trigonous and shining. The ocreae are terminated by long, firm bristles, which are 4-8 mm. long and about equal or often surpass the sheath itself in length.

The species is a native of subtropical and tropical eastern Asia, from China and Japan, through the Philippine Islands, to Java and Sumatra. It is known also under the names *Polygonum caespitosum* var. *longisetum* (De Bruyn) A. N. Steward, *P. Donii* var. *longisetum* (De Bruyn) Miq., *P. Blumei* Meisn., *P. buisanense* Ohki, *Persicaria Gentiliana* Lévl., and *Persicaria buisanensis* (Ohki) Sasaki. Ferguson distributed his specimens to the Local Herbarium of the New York Botanical Garden under the name "*Persicaria longiseta* (De Bruyn) Meisn.," but I am unable to find that this combination was ever published either by Meisner or by anyone else to date.

A summary of the herbarium material cited above, geographically arranged, is given herewith. The abbreviations in parentheses

indicate the herbarium in which the specimen is deposited [Cm = Carnegie Museum, Pittsburgh; D = Academy of Natural Sciences, Philadelphia; G = Gray Herbarium, Cambridge; J = Brooklyn Botanic Garden; N = New York Botanical Garden; Up = University of Pennsylvania, Philadelphia; W = United States National Herbarium, Washington]. MASSACHUSETTS: Norfolk Co.: *S. F. Blake 11379* (W), *11398* (W), *s.n.* [Stoughton] (G). CONNECTICUT: Fairfield Co.: *E. H. Eames 11621* (G), *s.n.* [Greenwich, 10/7/27] (G), *s.n.* [Greenwich, 9/3/29] (G), *s.n.* [Greenwich, 9/18/30] (G); New Haven Co.: *Eames 11451* (G). NEW YORK: Albany Co.: *H. D. House 24068* (G, Up); Bronx Co.: *J. Monachino s.n.* [*H. N. Moldenke 11747*] (N), *s.n.* [*Moldenke 11811*] (N), *s.n.* [*Moldenke 11813*] (N); Nassau Co.: *W. C. Ferguson s.n.* [Garden City, 7/1/18] (N), *s.n.* [Garden City, 8/16/20] (N), *s.n.* [Garden City, 8/16/22] (G); Suffolk Co.: *Ferguson 1462* (N); County undetermined: *Ferguson s.n.* [Plattsdale, 7/2/19] (N). NEW JERSEY: Bergen Co.: *Moldenke 11356* (N); Burlington Co.: *F. J. Hermann 3645* (D); Camden Co.: *B. Long 44957* (D, Up); Essex Co.: *L. H. Lighthipe s.n.* [Manda's, 10/15/12] (J); Hunterdon Co.: *W. M. Benner 8718* (D), *8719* (G); *Long 53845* (D); Mercer Co.: *Benner 8954* (D, G, N); Morris Co.: *R. H. True 395* (J, Up), *s.n.* [Morristown, 9/22/36] (Up); Somerset Co.: *Moldenke 11793* (N). PENNSYLVANIA: Allegheny Co.: *O. E. Jennings s.n.* [Hartwick, 10/4/30] (Cm, Up), *s.n.* [Pittsburgh, 10/31] (Cm, Up); Berks Co.: *H. Wilkens 5692* (Up), *5727* (D); Bucks Co.: *Benner 4655* (D); Chester Co.: *H. E. Stone s.n.* [Glenloch, 6/20/36] (D), *s.n.* [West Chester, 9/27/30] (D), *s.n.* [West Chester, 9/6/30] (D); *W. Trimble s.n.* [West Chester, 9/21/26] (D), *s.n.* [West Chester, 8/10/27] (D, G); *True 6542* (Up); Delaware Co.: *E. B. Bartram 1312* (D); *E. C. Earle 353* (D, Up), *s.n.* [Glenolden] (Up), *J. M. Fogg, Jr., 10029* (D, Up), *10064* (Up); *F. W. Pennell 16135* (G), *s.n.* [Moylan, 10/30/34] (D); *R. L. Schaeffer 1696* (D); Montgomery Co.: *Fogg 16423* (Up), *16480* (Up); *Long 35249* (D); *Schaeffer 5633* (D); *Stone s.n.* [Rosemont, 7/12/24] (D); *True 6542* (Up); *E. P. Walker 2271* (D); Perry Co.: *F. R. Fosberg 16292* (Up); Philadelphia Co.: *Benner 7492* (D, Up), *9060* (D); *Fogg 6227* (D, Up), *11369* (D, Up), *11374* (Up), *16266* (Up); *Long 45118* (D), *47390* (D); *True 4174* (Up). MARYLAND: Cecil Co.: *R. R. Tatnall 4702* (G).

DISTRICT OF COLUMBIA: *Blake s.n.* [Washington, 11/1/31] (W, W).

H. N. Moldenke 11812, collected by Joseph Monachino in waste ground on the grounds of the New York Botanical Garden, Bronx Park, on September 9, 1941, is huskier than the other material from this locality and has paler and more attenuate spikes. It is also common as a weed on the Botanical Garden grounds and seems quite distinct from *P. longiseta* in the field. It may very possibly represent some related form. Mr. Monachino has kindly supplied me with the following field notes about these two forms of the species: "There are on the grounds of the New York Botanical Garden two kinds of *Persicaria* that closely resemble each other in technical characters and neither of which answers to the description of any species described in current manuals of the region. These have features overlapping in all respects if the measurements of their parts are taken *in toto* and without interpretation—if, for instance, a depauperate individual of one is compared with an oversized individual of the other. Furthermore, these two kinds of *Persicaria* actually do intergrade at critical points, probably because of hybridization, but in general the colony or population of one is so clearly distinct from the population of the other that there is no doubt to the field student that the two represent separate entities. These two forms we here designate 'long-spiked' and 'short-spiked.' The 'long-spiked' form [*Moldenke 11812*], which is far more common here and is the form seen abundantly throughout the city and the immediate vicinity of New York, has the length of the typical flowering spike about 3.5 cm.; the length of the leaf-ocreae 10-11 mm., with their fringe-bristles 11-12 mm. long; and the leaf-blades 8.8-10 cm. long and 2.4-3 cm. broad. The 'short-spiked' form [*Moldenke 11747*] has the length of the spike 1.75-2.5 cm.; leaf-ocreae 6-7 mm., with bristles 6-8 mm.; and blades 5.5-7 cm. long and about 2 cm. broad. These measurements are only of typical specimens as seen in the field; the inflorescences are given their maximum lengths and the vegetative parts noted are those found at about the middle of the stems. In general habit the 'long-spiked' form is more robust than the 'short-spiked' form, darker green, the bristles frequently pink or red, the inflorescences more pointed at the tips, and comes into optimum bloom about two weeks later."

New York Botanical Garden
September 29, 1941

Amos Eaton

Amos Eaton, scientist and educator, 1776–1842. By Ethel M. McAllister. 587 pages. University of Pennsylvania Press, 1941. $5.00.

One by one the early American workers in the botanical field are receiving adequate attention at the hands of enthusiastic and competent biographers. It is nearly a century since Darlington devoted volumes to Baldwin and to the Bartrams and Marshalls; these consisted largely of letters written by and to those worthies, but contained biographical data to which little could be added today. In 1895, the late R. E. Call published a carefully digested record of the work of Rafinesque, which has stood the test of time. Several years ago Andrew D. Rodgers, 3rd, of Columbus, Ohio, became interested in botanical biography, and the first volume of what it is to be hoped may be an extended series from his pen was issued last year. This dealt with the life of Sullivant, and a parallel exhaustive treatment of Torrey's life is expected shortly. Similar in its evidence of thorough research, although not limited to a single subject, is S. W. Geiser's "Naturalists of the Frontier."

And now there lies before us a volume of nearly 600 pages devoted to Amos Eaton. Eaton's was a very forceful character, making a very strong impression upon every one whose life touched his. He was a versatile genius; first a practicing lawyer and land-agent, later a traveling lecturer on botany, mineralogy, geology, zoology, and chemistry, and finally the founder and head of the Rensselaer Polytechnic Institute, an educational establishment unique in its scope and methods. Throughout his earlier life he was beset by misfortunes that might have crushed a less buoyant spirit, but toward the end he was able to enjoy in comparative peace the fruits of his long and honorable career. An inscription on a bronze tablet in Amos Eaton Hall, at Rensselaer, sums up his life in these words: "Pioneer, as student, teacher, and author, in agriculture, botany, chemistry, and zoology. Promoter of field work and laboratory practice. Father of American geology. One of the great figures in the history of science in the United States. He directed the destinies of Rensselaer School from its inception until the year of his death."

Because of his versatility, Eaton is remembered by different persons for various reasons. To the botanists of this country, however,

he was a great figure in American botany, because of the stimulus he gave to the study of our science. Other botanists there had been and were, but only one of these, Benjamin Smith Barton, was particularly noted as a teacher; the circle of his influence was not large, and he died at a comparatively early age. Cultured people flocked to Eaton's lectures and were inspired by them, and he was the author of the first popular manual for the identification of our native plants. He was by no means as profound a botanical student as some of his contemporaries, but he was a good botanist, and devoted particular attention to the widest possible diffusion of such knowledge as he possessed. This constitutes his claim to remembrance by posterity.

The volume before us gives evidence of extensive and painstaking research, and the results are presented clearly and pleasingly. Perhaps the most confusing part of the book is in the few pages devoted to Eaton's "family life." The treatment here is full and accurate, but it is necessary to read and reread it before one can feel at all sure just how many wives and children Eaton really had; the number of each was unusually large.

A 55-page bibliography of the sources, both manuscript and printed, consulted in the preparation of the work, precedes the index. This is remarkable, not only for the large number of entries (more than 900), but for the exasperating incompleteness of detail in the case of many of them. The 666 letters are listed in detail, with names of writers and addressees, dates, and present location.

John Hendley Barnhart

New York Botanical Garden

A Bacteriology Laboratory Guide

Laboratory Guide in Elementary Bacteriology. By M. S. Marshall. The Blakiston Company, Philadelphia. 1941. Pp. 244. $1.75.

This is an unusual manual for beginning students in the study of bacteria. The subject matter is presented in such a way that analysis, thought and interpretation take precedence over the routine performance of the experiment. The material is presented from the standpoint that few students will pursue the subject further.

The manual is divided into six sections which include: Introductory Technique, Morphology, Physiology, Applied Bacteriology,

Serology, and Infection. Immunology is not considered in the text. A total of ninety-two experiments are covered and thirty-three of these are devoted to the physiology of bacteria where the major emphasis belongs. The directions are clear, concise, and free from extraneous material, all of which tends to develop sound technique.

The section on serology is especially well executed for beginners. The four experiments listed deal with the preparation of an antigen, the production of antibodies, electrolytes and agglutination. *Proteus vulgaris* is the organism used in the experiments and the rabbit is used to stimulate agglutinin production.

The experiments used in the section of applied bacteriology covers various phases of water, milk and its pasteurization, food spoilage, acetic acid, soil counts, and bacteria in root nodules. Each section of the book lists a series of questions pertaining to that particular topic, which require thought and analysis. The appendix tabulates miscellaneous information keeping the text free of irrelevant information.

Wm. J. Bonisteel

Fordham University.

FIELD TRIPS OF THE CLUB

Trips of May 24–25 (1941) to the Watchung Mountains

Sixty-six members and guests were present on these two trips, the first to Washington Valley, near Watchung, and the second to Seeley's Notch, near Scotch Plains, N. J.

In previous notes in Torreya on the flora of this area[1] 603 species, varieties, and forms have been recorded by their scientific names, in addition to many others listed less formally by only their common names. To conserve space and avoid needless repetition in the following reports species previously listed by their scientific names will be referred to only by their common names, while species or varieties not previously listed formally will be referred to once by their scientific names and thereafter only by their common

[1] Torreya **31**: 29–36 (1931), **36**: 57–61 and 88–93 (1936), **38**: 10–11, 103–105 and 157–158 (1938), **39**: 143–145 (1939), **40**: 24–25 and 177–179 (1940), and **41**: 23–25 (1941).

names.[2] To date 1,737 different species, varieties, and forms of wild plants and 533 of cultivated plants have been found in the area within 10 miles of the town hall of Watchung.

Among the 444 different kinds of wild plants identified on these two trips were many not before recorded on these pages. In Seeley's Notch we found the northern hedge-hyssop (*Gratiola neglecta*), glaucous honeysuckle (*Lonicera dioica*) clearweed (*Pilea pumila*), common wild-indigo (*Baptisia tinctoria*), hairy bedstraw (*Galium pilosum*), common wild-liquorice (*G. circaezans*), American hedge bindweed (*Convolvulus americanus*), reed canary-grass (*Phalaris arundinacea*), and Virginia bugleweed (*Lycopus virginicus*). Six kinds of *Rubus* were studied and compared with each other, *R. alleghaniensis, R. frondosus, R. hispidus, R. occidentalis, R. phoenicolasius,* and *R. procumbens.* The showy purple-flowering raspberry and three hickories, *Carya cordiformis, C. glabra,* and *C. ovata,* were found also in the Notch. On a dump at Fanwood several plants of the large white ground-cherry (*Leucophysalis grandiflora*) turned out to be the most important find of the day. I know of no other record of this species from the Middle Atlantic States. Three species of locust were in full bloom and provided a splendid show—the clammy locust, black locust (*Robinia pseudo-acacia*), and bristly locust (*R. hispida*). The hollyhock (*Althaea rosea*) was discovered as an escape.

On the Second Watchung Mountain we found the leaves of northern wild-comfrey (*Cynoglossum boreale*), numerous specimens of pitch pine (*Pinus rigida*), butternut (*Juglans cinerea*), black walnut (*J. nigra*), common speedwell (*Veronica officinalis*), and thymeleaf speedwell (*V. serpyllifolia*). Six kinds of *Viburnum* were studied—the mapleleaf arrow-wood, snowball-tree, downyleaf arrow-wood, American cranberry-tree, common arrow-wood (*V. dentatum*), and black-haw (*V. prunifolium*), all in flower. In Wetumpka Notch we found the meadow garlic (*Allium canadense*) growing almost alongside of the common wild garlic seen on every previous trip. The American trembling aspen (*Populus tremu-*

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[2] Nomenclature, both scientific and common, for the wild flora is in accordance with that used in "A list of the observed flora of Watchung, N. J., and its immediate vicinity," distributed by the Union County Park Commission, Warinanco Park, Elizabeth, N. J. (1940) and, for the cultivated flora, in accordance with that used in "Cultivated Plants," by H. N. Moldenke (1938)

loides) and large-toothed aspen (*P. grandidentata*), growing in close proximity, were in good condition for comparison. In Washington Valley were seen the common Indian-bean, Pursh's figwort (*Scrophularia lanceolata*), balsam ragwort (*Senecio balsamitae*), and four plantains, *Plantago lanceolata, P. rugelii, P. major* var. *vulgaris,* and *P. major* var. *sinuata.* Both the wild yellow plum and the Canada plum (*Prunus nigra*) were much in evidence. The plantain blueweed (*Echium plantagineum*) proved to be a novelty for most of the party, while a young honey-locust (*Gleditsia triacanthos*) became the first known record for this species from the area.

Cryptogams noted included the birch polypore (*Polyporus betulinus*), bog moss (*Sphagnum squarrosum*), campfire-moss (*Funaria hygrometrica*), common haircap-moss (*Polytrichum commune*), rattlesnake-fern, ebony spleenwort, American lady-fern (*Athyrium angustum*), brittle-fern, hay-scented fern (*Dennstaedtia punctilobula*), sensitive-fern, long beech-fern (*Phegopteris polypodioides*), American polypody, Christmas fern, American bracken, blunt-lobed woodsia-fern, cinnamon-fern, interrupted-fern, and field horsetail (*Equisetum arvense*).

H. N. Moldenke

Trips of September 6–7 through Seeley's and Wetumpka Notches

Twenty-six members and guests were present on these trips to the Watchung Mountains in northern New Jersey. Since the last report in Torreya [Trips of May 24 and 25, 1941] twenty-one additional kinds of wild plants have been found in the area, bringing the total to 1,758.

On the two trips here being reported on, 538 different kinds of plants were identified, an all-time high for trips to this region. Thanks to the help of Mr. Nearing 48 species of cryptogams were identified, of which the following have not yet been reported on these pages: *Mutinus caninus, Flammula magna, Hypomyces lactifluorum, Agaricus silvicola, Venenarius crenulatus, Stereum gausapatum, Russula varians, Hydrocybe conica, Russula delica, Pluteus cerbinus, Hydnum repandum, Prunulus galericulatus, Clavaria flava,* and *Russula purpurina,* among the fungi, and *Diphyscium sessile, Ditrichum pallidum,* and *Pogonatum brevicaule,* among the mosses.

In or near Seeley's Notch we found the extremely rare cream-colored spotted jewel-weed (*Impatiens biflora* f. *albiflora*) among a patch of the normal form, the recently introduced Asiatic bristly ladysthumb (*Persicaria longiseta*), the common water-pepper (*Persicaria hydropiper*) and American germander (*Teucrium canadense*), common beggar-ticks (*Bidens frondosa*) and purple-stemmed swamp beggar-ticks (*B. connata*), white sweet-clover (*Melilotus alba*), and northern star-grass (*Hypoxis hirsuta*). On a dump at Fanwood was found in full fruit the Chinese lantern-plant (*Physalis alkekengi*) and in the woods near the spot where the whorled pogonia and moccasin-flower grow in such abundance was the purple chokeberry (*Aronia prunifolia*). In Wetumpka Notch we saw the smooth ground-cherry (*Physalis subglabrata*) and Virginia wild-rye (*Elymus virginicus*), while in the fields and along the roadsides in Washington Valley were thousands of specimens of sheep's fescue (*Festuca ovina*), Pennsylvania ladysthumb (*Persicaria pensylvanica*), common evening-primrose (*Oenothera biennis*), black medic (*Medicago lupulina*), cow vetch (*Vicia cracca*), and the never-before-discovered Virginia beardgrass (*Andropogon virginicus*). The purple-head sneezeweed (*Helenium nudiflorum*) filled one meadow in great profusion, growing along with common boneset, common trumpetweed, New York ironweed, arrowleaf tear-thumb, hairy milkweed, and clustered beak-rush. In the woods members of the party observed the large-bracted tick-trefoil (*Desmodium bracteosum*), few-flowered agrimony (*Agrimonia parviflora*), woodland agrimony (*A. rostellata*), shin-leaf (*Pyrola elliptica*), beach-drops (*Epifagus virginiana*), hairy hawkweed (*Hieracium gronovii*), and white rattlesnake-root (*Nabalus albus*). Both the large-flowered and the small-flowered sensitive-peas were seen (*Chamaecrista fasciculata* and *C. procumbens*) and, in the open sunny fields, vast beds of white heath aster (*Aster ramosissimus*). Other interesting plants included the tall thimbleweed (*Anemone virginiana*), creeping yellow water-cress (*Radicula sylvestris*), two species of purple gerardia, two species of false-foxglove, the dense gayfeather, and the fringed gentian. Of interest also was the examition of many specimens of garden mock-orange (*Philadelphus coronarius*), scentless mock-orange (*P. inodorus*), and common ninebark (*Physocarpus opulifolius*) which have persisted for 20 or more years without cultivation in a dense tangle of native vegetation.

H. N. Moldenke

Trip of September 13–14, 1941

Perfect weather and congenial companions made the week-end outing of September 13 and 14 in the Catskills a delightful experience for those who went to Shandaken under the leadership of Mr. Frederick R. Lewis. With him six people interested in botany and mycology made the trip: Mr. William Pfeifer, Dr. Bernard Friedman, Mrs. Werner Hartman, Mr. Stephen Walker, Miss Myrtle Waterfall, and Miss Marion White. A large "housekeeping" cabin, part of Lyons' Mountain Spring Camp, provided a fine view of river and mountains, sleeping quarters, warmth, and cooking facilities. Speaking of cooking—if anyone in the Torrey Club can excel Mr. Lewis as a buyer, dietitian, and chef, he is yet to be found. Such meals as he planned more than satisfied the voracious appetites of the hikers who, on Saturday afternoon, explored the region in the vicinity of Fox Hollow below Panther Mountain and, on Sunday, the Woodland Valley up to the junction of Giant Slide and Panther Mountain trail.

The trip was, in every way, a success. At least sixty-five different species of fungi were collected and identified, to say nothing of toads, mosses, and clinging burrs. The glorious views, pure mountain air, and the interest shown by the seven members made the trip memorable. May an opportunity for such an excursion come again next year!

Marion L. White

Trip of September 28 (1941) to Highland Mills, N. Y.

On September 28 a party of seven visited the railroad cut at Highland Mills, N. Y., and found an abundance of Lower Devonian fossils. Good specimens of *Spirifer aroostookensis Leptocoelia flabellites, Rensellaeria ovalis* and *Grammysia arcuata* were obtained by all. An exceptionally fine complete specimen of the trilobite *Phacops cristata* was uncovered. Following the collection of these fossils the party crossed to the east side of Pine Hill where exposures of Silurian quartzite conglomerate were seen and then up the mountain of granite gneiss to the east. Here luncheon was punctuated by falling acorns.

In the afternoon the party traveled west of the Devonian range to the Ordovician slates of the Hudson River Group. These they followed to Warwick, N. Y., through a countryside splashed with

autumn colors. From the top of Bellvale Mountain the broad expanse of the Ordovician terrane stretched to the northwest where mist hid its termination at the Shawangunk Mountain Range. Descending the east side of the mountain toward Greenwood Lake, a stop at vertical-standing Upper Devonian shales enabled the party to collect some plant impressions of some of the earliest land plants. In the mountains east of Greenwood Lake pre-Cambrian granite-gneiss was seen, likewise some beaver ponds. At one of these, sweet wild grapes growing by the roadside furnished the last of the unexpected pleasures of the day.

CECIL H. KINDLE

PROCEEDINGS OF THE CLUB

MINUTES OF THE MEETING ON MAY 21, 1941

The meeting was called to order by the President, Dr. J. S. Karling, at the Boyce Thompson Institute for Plant Research at 3:40 P.M., following the serving of excellent refreshments by the staff of the Institute. Forty-five members and guests were present.

The minutes of the previous meeting were adopted as read.

It was voted that the following be admitted by unanimous ballot to annual membership: Miss Ruth R. Richards, Milwaukee-Downer College, Milwaukee, Wis.; Mr. Burritt K. Lupton, Franklin Ave., Wyckoff, N. J.; Mr. Robert S. Platt, Jr., 10820 Drew St., Chicago, Ill.; Dr. William Henry Eyster, 130 S. 13th St., Lewisburg, Pa.; Mr. John H. Schaefer, 5305 44th St., Laurel Hill, L. I., N. Y.; Mr. Morris Deitchman, 404 Central Tower, Youngstown, Ohio; and Dr. Arthur W. Proetz, 12 Westmoreland Pl., St. Louis, Mo.; to associate membership: Mr. Jose Perez Carabia, New York Botanical Garden, New York, N. Y.; Mr. Severin Rapp, Box 417, Sanford, Fla.; Mr. Harold Epstein, 5 Forest Ct., Larchmont, N. Y.; and Mr. Stephen Walker, 15 Lincoln Park, Newark, N. J. The transfer of Miss Sara J. Stewart, 64 Linwood Rd., New Rochelle, N. Y., from annual to associate membership was approved. The resignations of Mr. John Masek, Apopka, Fla., from annual membership and Miss Amy E. Davis, 230 E. 71st St., New York, N. Y., from associate membership were accepted with regret.

The President announced that the Council had elected Dr. W. G. Whaley of Columbia University as Treasurer of the Club.

Dr. Dodge moved that the Corresponding Secretary be instructed to draw up a letter expressing a vote of thanks to the former Treasurer, Dr. Moldenke. Dr. Hazen seconded the motion and the Club so voted.

Dr. Bold stated that January 21, 1942, was the birthday of Dr. Harper. Dr. Bold moved that the 1942 volume of the Bulletin of the Club be dedicated to Dr. Harper. Dr. Hazen seconded the motion and after discussion the motion was carried.

President Karling, on behalf of the Club, extended thanks to the Boyce Thompson Institute for their courtesy in entertaining the Club.

The scientific part of the program consisted of three talks. The first speaker was Dr. Arthur Hillegas of Columbia University who spoke on "The relative abundance of chytridaceous fungi during the winter." The speaker's abstract follows:

Collections of water and decaying vegetation were made monthly during October to April in Van Cortlandt Park Lake, New York City. These samples were "baited" for saprophytic chytrids with corn leaves, from which the chlorophyl had been extracted with alcohol, and non-waterproof cellophane. From each collection, at least three, in some cases seven, species of chytrids belonging to the families Rhizidiaceae and Cladochytriaceae were obtained on these substrata. This survey indicates the abundance and variety of chytridiaceous fungi present during the winter months.

The second speaker was Dr. Norma E. Pfeiffer of the Boyce Thompson Institute who spoke on "Storage of pollen of some ornamentals." The speaker's abstract follows:

The life of pollen of some ornamentals, including Lilium, Amaryllis, Gladiolus, Zephyranthes, Rhododendron, and Azalea, has extended far beyond the natural duration under ordinary conditions, by means of controlled conditions of humidity and temperature in the darkness. Saturated solutions of magnesium chloride, calcium chloride and potassium carbonate, in closed containers, provide suitable humidities in the atmosphere over the solutions while the temperature in automatic refrigerators is advantageous. Favorable humidities may also be attained through the use of sulphuric acid solutions. Still another method is storage of pollen in tubes which are then evacuated and sealed, and kept at low temperatures, as 5° C., —5° C. or as low as —15° C. Tests for viability include germination of pollen on artificial media and setting of seed after application to the stigma. Strong plants grown from seed resulting from the use of Easter lily pollen stored three years and one from pollen stored five years are evidence of successful methods.

The third speaker was Dr. A. E. Hitchcock of the Boyce Thompson Institute who spoke on "Formative effects induced with certain growth-regulating substances." The speaker's abstract follows:

Regulatory and formative effects induced by naphthoxyacetic acid and other naphthoxy compounds were described with particular reference to modifications of leaves, flowers, and fruits of tomato and other genera. Patterns of modified tomato leaves varied from simple types with little or no dentation to frenched or fern-leaf types. Clearing of veins was characteristic of modified leaves of most genera. These leaves resembled those of virus-diseased or mite-infested plants. Treatment of normal flower buds with powder preparations, solutions, or vapors of naphthoxy compounds induced the development of seedless fruit of normal shape or in some cases with a slightly conical apex. Soil treatment of tomato which caused pronounced modification of new or developing leaves also induced the formation of abnormally long flower buds. Spraying these buds with naphthoxy compounds caused the development of seedless fruit which was invariably ovate or oblong-ovate, indicating that the soil treatment had modified the genetical mechanism governing shape. Vapor from the equivalent of three drops of naphthoxy ester applied at one end of the greenhouse caused fruit set on tomato plants throughout the house. Of the several indole, phenyl, naphthalene, and naphthoxy compounds which induce formative effects, only the naphthoxy compounds caused pronounced modifications in the patterns of leaves and clearing of the veins.

The meeting was adjourned at 4:45 P.M.

Respectfully submitted,

John W. Thomson, Jr.
Recording Secretary

Meeting of October 7, 1941

The meeting was called to order by the President, Dr. J. S. Karling, at the Brooklyn Botanic Garden at 8:20 P.M. Forty-eight members and guests were present.

The minutes of the previous meeting were adopted as read.

It was voted that the following be admitted by unanimous ballot to annual membership in the Club: Mr. Royal F. Strickland, 2227 Noble Rd., Cleveland Heights, Ohio; Dr. Ralph W. Chaney, Dept. Paleontology, University of California, Berkeley, Calif.; Mr. Thomas J. Cobbe, 3118 School St., Cincinnati, Ohio; Mr. Robert K. Lampton, 2621 Cheltenham Rd., Toledo, Ohio; Dr. F. E. Twining, P. O. Box 1472, Fresno, Calif.; Mr. Hollis Koster, Camp F. W. S. 2, Absecon, N. J.; Mr. Charles W. Slack, Box 2211, At-

lanta, Ga.; Mr. Irving Granek, 367 Vernon Ave., Brooklyn, N. Y.; Dr. A. Orville Dahl, Biological Laboratories, Harvard University, Cambridge, Mass.; Mrs. Audrey H. Israel, Box 1037, Short Hills, N. J.; Prof. Earle Drummond, West Liberty, W. Va.; Miss Ernestine Ball, 44 Woodland Ave., Columbus, Ohio; Miss Helen Trowbridge, 351 Marion Ave., Glen Ellyn, Ill.; Rev. Damian W. Milhone, O.S.B., St. Bede College, Peru, Ill.; Miss Elizabeth E. Adams, 330 Warwick Ave. Mount Vernon, N. Y.; Mr. John Robinson, R. R. 5, New Castle, Pa.; Dr. James H. Porter, Porterfield, P. O. Box 1061, Macon, Ga.; Mr. Paul V. Mook, 78 Franklin St., Morristown, N. J.; Dr. Crispin Oglebay, Hanna Building, Cleveland, Ohio; Dr. C. C. Harrold, 700 Spring St., Macon, Ga.; Mrs. J. Kidwell Grannis, Flemmingsburg, Ky.; Sister M. Mira, O.S.F., 1413 S. Layton Blvd., Milwaukee, Wis; to associate membership: Miss Jerry Hood, 976 Simpson St., New York, N. Y.; Miss Hilda Spieler, 190 East Moshulu Parkway South, Bronx, New York, N. Y.; Mr. Louis E. Johns, Skidmore College, Saratoga Springs, N. Y.; Miss Louise Bauer, 55 Tiemann Pl., New York, N. Y.; Miss Maude E. Purdue, Box 246, Bethel, Conn.; Mr. Emanuel A. Gottlieb, 3080 Hull Ave., New York, N. Y.; Miss Grace M. Donovan, 1734 Jarvis Ave., New York, N. Y.; and Miss Ruby Demoret, R. R. 3, Oregon Corners, Peekskill, N. Y. The resignations of Dr. W. A. Kuntz, Lake Alfred, Fla.; Sister M. Hyacinth, 3901 N. Ridgeway, Chicago, Ill.; and Mr. Eugene Steinhardt, 15 Crooke Ave., Brooklyn, N. Y., from annual membership were accepted wtih regret. The death of two members, Miss Anna May Callan and Dr. Charles Vetter, were reported with regret. The President announced that the Council had instructed the Corresponding Secretary to write letters expressing the regret of the Club to the surviving members of their families.

The President announced that Dr. Dodge had been appointed official delegate of the Club to attend the ceremonies marking the centennial of the founding of Fordham University, and that Drs. Matzke and Karling had been appointed as alternates.

Dr. Karling, as Chairman of the 75th Anniversary Committee, reported that the Committee had not come to a decision on whether or when to hold this celebration of the Club.

Dr. Gager moved that Article XIII of the Constitution be amended as proposed by Dr. Rickett in the meeting of March 19,

1941, to include the words "and the Memoirs" after "Index Cards." Dr. Clum seconded the motion. After discussion, the motion was carried by unanimous vote.

Discussion of suggestions for the 75th Anniversary Program followed. Dr. Gager moved that the Club celebrate its 75th Anniversary at a date in June, 1942. Dr. Camp seconded the motion and the Club so voted. It was suggested by several members that field trips be included in the program. Dr. Camp moved that the Chairman of the Committee be empowered to invite such other societies as he saw fit to participate in the Anniversary celebrations. The motion was seconded and carried.

The remainder of the meeting was devoted to a discussion of the summer experiences of some of the members. Dr. Cheney reported that, with Dr. Gager's book on Botanical Gardens of the World in hand, he had visited many of the botanical gardens in the western United States. He was particularly impressed by that at Santa Ana, and by the Ginkgo National Park in Washington with its numerous fossils of that tree.

Dr. Arthur Graves reported that he had visited the only surviving charter member of the Torrey Botanical Club, Dr. H. M. Denslow. Dr. Denslow joined the Club when he was fifteen and has been a member for seventy-five years. Dr. Bold read a letter from Dr. Denslow expressing his appreciation for the letter written by the Corresponding Secretary on behalf of the Club on the occasion of his anniversary.

Dr. Graves brought samples of the results of his work on crossing the Japanese and American chestnuts, and discussed the work.

Dr. Wodehouse reported that he had continued his studies on cases of hay fever of unknown origin. These cases coincide in distribution with many coastal plain plants. It was found that extracts from the cockroach, *Periplaneta americana,* gave a positive reaction in a high percentage of these cases. Dr. Wodehouse's description of the trials of a hunter of live cockroaches in the South highly entertained the members of the Club. Cockroach fever, like ragweed fever, is a disease of civilization according to Dr. Wodehouse.

Dr. Camp claimed that he had examined practically every blueberry patch from Maine to Florida during the past season.

The President expressed thanks on behalf of the Club to Dr. Gager and the members of staff of the Brooklyn Botanic Garden for their many courtesies to the Club.

The meeting was adjourned at 9:40 P.M. to enjoy the refreshments served by the members of staff of the Garden.

Respectfully submitted,

John W. Thomson, Jr.
Recording Secretary

NEWS NOTES

The Choice of Words

We have received the following communication from Dr. Fuller:

"I believe that a statement in Dr. Rickett's review of The Transeau—Sampson—Tiffany textbook in August's Torreya unjustly blames the authors, at least by implication, for the 'etymological waif—monoploid.' In volume 28 (1937) of the Journal of Heredity, on page 76 begins a glossary of genetics terms, prepared and approved by the American Genetic Association, which sanctions the use of the word monoploid. Thus, Professors Transeau, Sampson and Tiffany are well justified in their use of this term, and Dr. Rickett's criticism is unwarranted. I hope you will bring this matter to his attention or to that of your readers—or both."

Harry J. Fuller
University of Illinois
Department of Botany

Dr. Rickett states:

"I am grateful to Dr. Fuller for the reminder that the authors need not be blamed for the creation of the word "monoploid." I am grateful also for the reference which shows that geneticists commonly use it in a sense different from that intended in the textbook. All I said was that (1) it is an *unnecessary* substitute for 'haploid'; (2) that its *etymology* is not so reputable. I believe that these two statements are unaffected by its inclusion in a glossary."

H. W. Rickett
New York Botanical Garden

Torreya will be very glad to print comments on articles and reviews that appear from time to time, provided, however, they are written in the spirit of helpful criticism. Reviewers are free to call

attention to any "etymological waifs" found within the covers of books they review.

Wm. J. Bonisteel
Editor

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3,	May-June	June 19, 1941
4,	July-August	August 24, 1941
5,	September-October	October 30, 1941
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